U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-266 776

Lakes Ouachita, Hamilton, and Catherine; Montgomery, Garland, and Hot Spring Counties, Arkansas

National Eutrophication Survey, Las Vegas, Nev

Prepared for

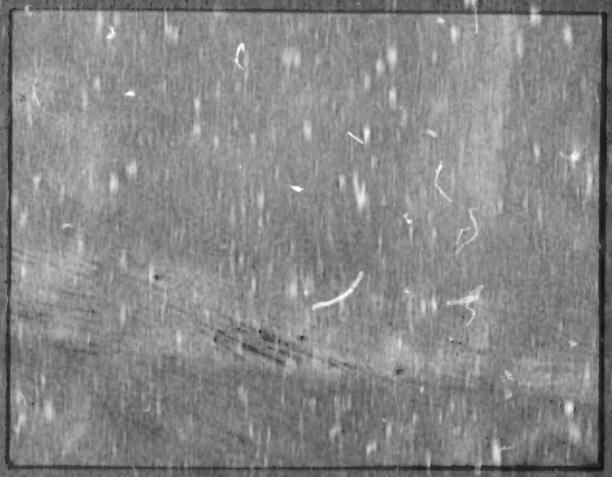
Environmental Monitoring and Support Lab, Las Vegas, Nev

Jan 77

PB 266 776

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES



CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON
and
ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

REPORT
ON
LAKES OUACHITA, HAMILTON, AND CATHERINE
MONTGOMERY, GARLAND, AND HOT SPRING
COUNTIES
ARKANSAS

EPA REGION VI

WORKING PAPER No. 483

WITH THE COOPERATION OF THE

ARKANSAS DEPARTMENT OF POLLUTION

CONTROL AND ECOLOGY

AND THE

ARKANSAS NATIONAL GUARD

JANUARY, 1977

2<

REPORT ON LAKES OUACHITA, HAMILTON, AND CATHERINE
MONTGOMERY, GARLAND, AND HOT SPRING COUNTIES, ARKANSAS
EPA REGION VI

by

National Eutrophication Survey

Water and Land Monitoring Branch
Monitoring Applications Laboratory
Environmental Monitoring & Support Laboratory
Las Vegas, Nevada

and

Special Studies Branch
Corvallis Environmental Research Laboratory
Corvallis, Oregon

Working Paper No. 483

OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY

January 1977

3<

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.

4. TITLE AND SUBTITLE
Report on Lakes Ouachita, Hamilton, and Catherine; Montgomery, Garland, and Hot Spring Counties, Arkansas

5. REPORT DATE
Prepared January 1977

6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)
Anonymous (National Eutrophication Survey Staff)

8. PERFORMING ORGANIZATION REPORT NO.
Working Paper No. 483

9. PERFORMING ORGANIZATION NAME AND ADDRESS
National Eutrophication Survey
U.S. Environmental Protection Agency
P.O. Box 15027
Las Vegas, NV 89114

10. PROGRAM ELEMENT NO.

11. CONTRACT/GRANT NO.

12. SPONSORING AGENCY NAME AND ADDRESS
Office of Research and Development
U.S. Environmental Protection Agency
401 M Street, S. W.
Washington, DC 20460

13. TYPE OF REPORT AND PERIOD COVERED
Final - 1974

14. SPONSORING AGENCY CODE
600/07

15. SUPPLEMENTARY NOTES
Prepared in cooperation with the U.S. Environmental Protection Agency, Corvallis Environmental Research Laboratory, Eutrophication Survey Branch, Corvallis, OR 97330

16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		05B 05C

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited		113
	20. SECURITY CLASS (This page)	22. PRICE PC A06 MF A01

EPA Form 2220-1 (9-73)

CONTENTS

	Page
Foreword	ii
List of Arkansas Study Lakes	iv
Lake and Drainage Area Map	v,vi,vii
Sections	
I. Conclusions	1
II. Lake and Drainage Basin Characteristics	6
III. Lake Water Quality Summary	8
IV. Nutrient Loadings	18
V. Literature Reviewed	27
VI. Appendices	28

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Arkansas Department of Pollution Control and Ecology for professional involvement, to the Arkansas National Guard for conducting the tributary sampling phase of the Survey, and to those Arkansas wastewater treatment plant operators who provided effluent samples and flow data.

The staff of the Water Division of the Arkansas Department of Pollution Control and Ecology provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper series.

Major General Thomas C. Armstrong, the Adjutant General of Arkansas, and Project Officer Colonel Lavaun M. James, who directed the volunteer efforts of the Arkansas National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

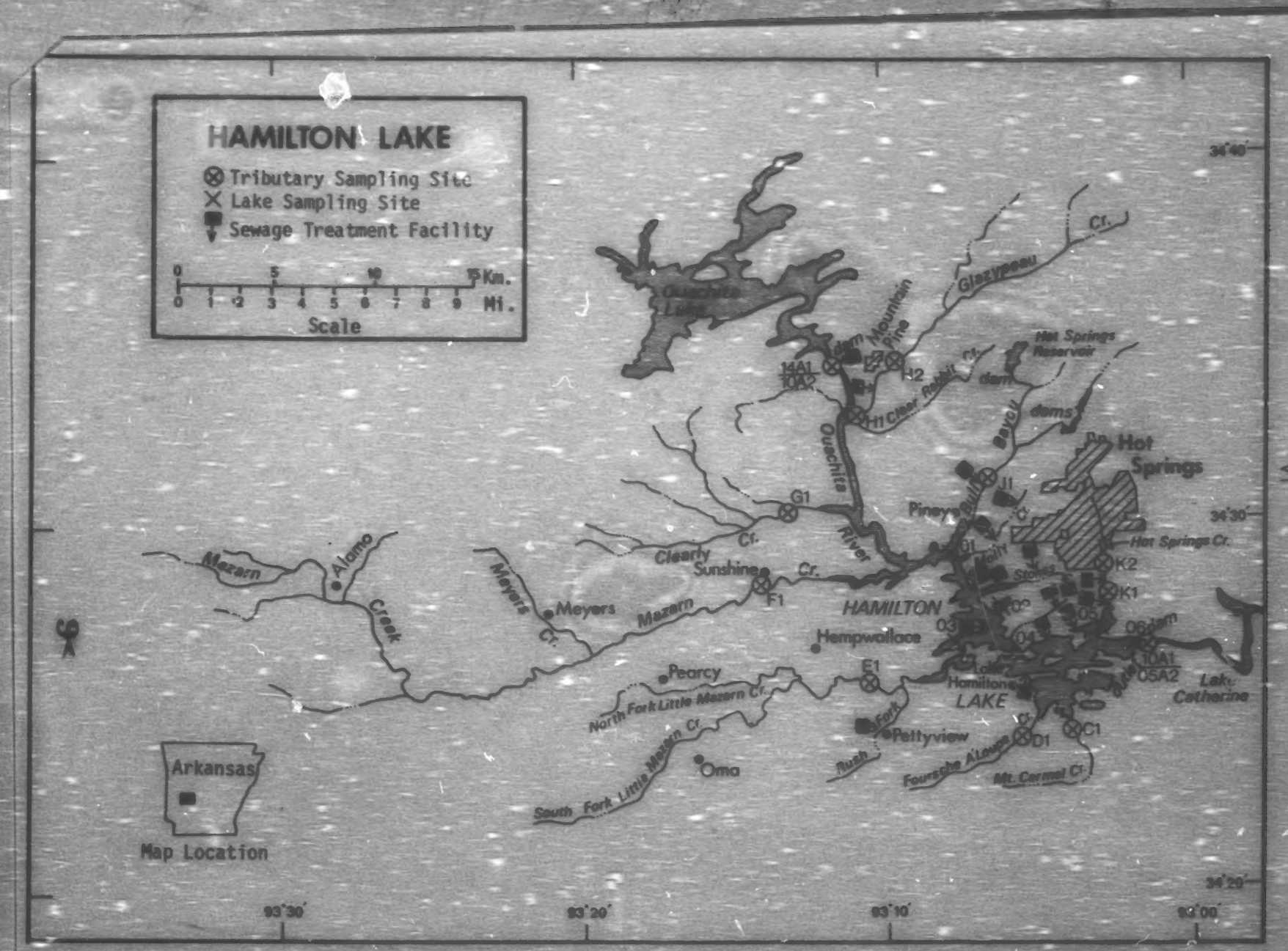
NATIONAL EUTROPHICATION SURVEY

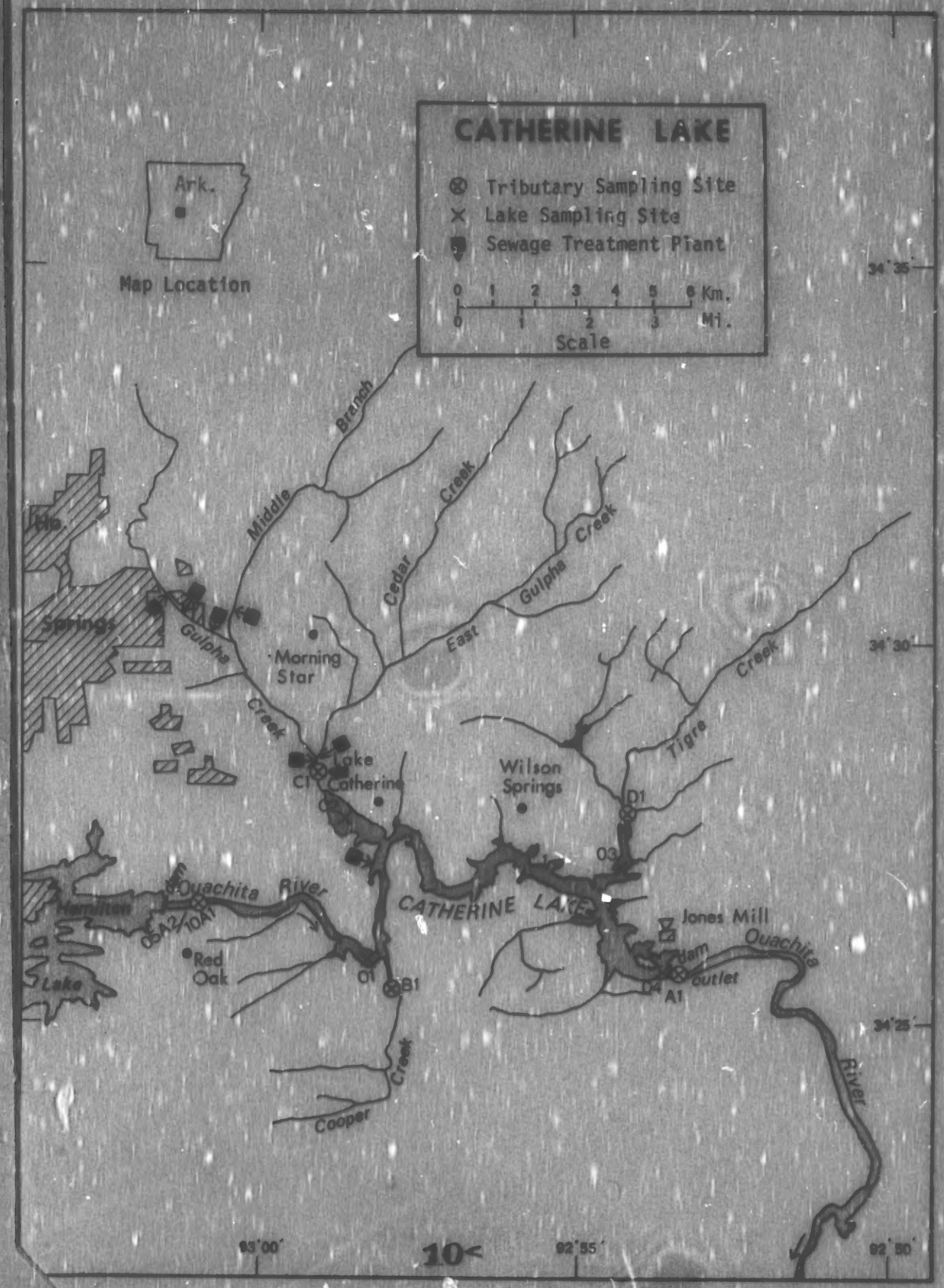
STUDY LAKES

STATE OF ARKANSAS

LAKE NAME	COUNTY
Beaver	Benton, Carroll, Washington
Blackfish	Crittenden, St. Francis
Blue Mountain	Logan, Yell
Bull Shoals	Baxter, Boone, Marion (Taney, Ozark in MO)
Catherine	Garland, Hot Spring
Chicot	Chicot
DeGray	Clark, Hot Spring
Erling	Lafayette
Grand	Chicot
Greer's Ferry	Van Buren, Cleburne
Hamilton	Garland
Millwood	Hempstead, Howard, Little River, Sevier
Nimrod	Perry, Yell
Norfork	Baxter, Fulton (Ozark in MO)
Ouachita	Garland, Montgomery
Table Rock	Boone, Carroll (Barry, Taney in MO)

OUACHITA LAKE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
Land Subject to Inundation
Scale


HAMILTON LAKE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
0 5 10 15 Km.
0 1 2 3 4 5 6 7 8 9 Mi.
Scale
Arkansas
Map Location
Ouachita Lake
Mountain Pine
Glazypeau Cr.
Hot Springs Reservoir
dam
dams
Clear Rabbit Cr.
Bayou
Hot Springs
Hot Springs Cr.
Ouachita River
Pineys
Bull Cr.
Molly Cr.
Stokes
HAMILTON LAKE
Lake Hamilton
Lake Catherine
Outlet
Clearly Cr.
Sunshine
Cr.
Mazarn
Alamo Creek
Meyers Cr.
Meyers
Hempwallace
Pearcy
North Fork Little Mazarn Cr.
South Fork Little Mazarn Cr.
Oma
Pettyview
Rush Fork
Fourche A'Loupe Cr.
Mt. Carmel Cr.
14A1
10A2
H1
H2
G1
F1
E1
J1
K1
K2
D1
C1
10A1
05A2
34°40'
34°30'
34°20'
93°30'
93°20'
93°10'
93°00'


CATHERINE LAKE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Plant
0 1 2 3 4 5 6 Km.
0 1 2 3 Mi.
Scale
Ark.
Map Location
Middle Branch
Cedar Creek
East Gulpha Creek
Gulpha Creek
Springs
Morning Star
Lake Catherine
C1
Wilson Springs
Tigre Creek
D1
O3
CATHERINE LAKE
Ouachita River
Hamilton
Lake
05A2/10A1
Red Oak
O1
B1
Cooper Creek
Jones Mill
dam
outlet
O4
A1
Ouachita River
34°35'
34°30'
34°25'
93°00'
92°55'
92°50'

10<

REPORT ON LAKES OUACHITA, HAMILTON, AND CATHERINE

STORET NOS. 0514, 0510, and 0505

I. CONCLUSIONS

A. Trophic Condition:*

Bases upon Survey data and field observations, Lake Ouachita is classified as mesotrophic. Potential for primary production as indicated by algal assay control yield was low to moderate. Chlorophyll a values ranged from a low of 0.4 µg/l in the spring to a high of 12.3 µg/l in the fall with a mean of 4.3 µg/l. The mean Secchi disc reading for the lake was 111 cm. There was dissolved oxygen depletion at Stations 04, 05, and 06 during the fall sampling and Survey limnologists reported hydrogen sulfide odor from water samples collected at those stations. Of the 16 Arkansas lakes sampled in 1974, 13 had greater median total phosphorus levels, 9 had greater median inorganic nitrogen values, and 8 had greater median dissolved orthophosphorus levels than Lake Ouachita.

Lakes Hamilton and Catherine are classified as eutrophic, i.e., nutrient rich and highly productive based upon Survey data and field observations. Whether such nutrient enrichment is to be considered beneficial or deleterious is determined by its actual or potential impact upon designated beneficial water uses of each lake.

*See Appendix E.

Potential for primary productivity was moderate to high as indicated by algal assay control yield. Chlorophyll a values had a mean of 10.9 µg/l in Lake Hamilton and 14.0 µg/l in Lake Catherine. Of the 16 Arkansas lakes sampled in 1974, 8 had greater median total phosphorus, 11 had greater median inorganic nitrogen, and 8 had greater median dissolved orthophosphorus levels than Lake Hamilton; 7 had greater median total phosphorus, 6 had greater median inorganic nitrogen, and 8 had greater median dissolved orthophosphorus levels than Lake Catherine.

J. Nix (1971) reports that the temperature and dissolved oxygen regime of both Lakes Hamilton and Catherine are greatly affected by the release of cold water from Lake Ouachita. This cold density current is present throughout the lower portion of both reservoirs during stratified periods. He suggests that proper regulation of cold water from upstream impoundments could prevent troublesome downstream water quality problems as the cold density current prevents total oxygen depletion. In the side pockets of the reservoirs studied where such a density current was absent, oxygen depletion was observed.

B. Rate-Limiting Nutrient:

Algal assay results indicate that Lakes Ouachita, Hamilton, and Catherine were limited by available phosphorus levels. Spikes with phosphorus or nitrogen and phosphorus simultaneously resulted in increased assay yields. Addition of nitrogen alone did not stimulate a growth response. The ratios of available nitrogen to orthophosphorus (N/P) in sampled waters substantiate phosphorus limitation during the summer and fall sampling seasons in Lakes Ouachita and Hamilton and during all three rounds on Lake Catherine. The N/P ratios indicate nitrogen limitation during spring in Lakes Ouachita and Hamilton.

C. Nutrient Controllability:

1. Point sources -

The mean annual phosphorus load from point sources was estimated to be 2.1% of the total load reaching Lake Ouachita. The city of Mount Ida contributed a total of 1.6%.

Phosphorus loading from point sources was estimated to be 50.6% of the total reaching Lake Hamilton. The city of Hot Springs contributed a total of 44.7% from one plant and the remaining known wastewater treatment plants contributed 5.9% of the total phosphorus load. Point sources contributed an estimated 53.7% of the total phosphorus load reaching Lake Catherine. The city of Hot Springs (Bellaire) contributed 36.9% from one plant. The remaining known plants contributed 16.8% of the total load.

Loading to Lake Ouachita was below that proposed by Vollenweider (1975) for a lake of such volume and retention time. The loadings of 2.95 $g/m^2/yr$ for Lake Hamilton and 10.04 $g/m^2/yr$ for Lake Catherine are four and six times, respectively, the oligotrophic levels proposed by Vollenweider. Although Vollenweider's model may not apply to Lake Catherine (retention time of only eight days), it is expected that substantial reduction of known municipal and industrial loading is required to improve the water quality in Lakes Hamilton and Catherine and maintain the high water quality in Lake Ouachita. The Dixiart industrial plant no longer discharges in Lake Ouachita.

The calculations of loading based upon available nutrient concentrations and flow data indicate a net export of nitrogen from both Lakes Hamilton and Catherine. This could be attributed to the lack of loading values for the known industrial plants discharging into both lakes, or to several known municipal plants discharging into Lake Hamilton for which loading values have not been calculated. These include: Beacon Manor Condominiums, Lake Hamilton Marine, Hamilton House, Baywood Colony, Moonlight Bay Condominiums, Arkansas Power and Light, and Wacaster Mobile Home Park; it is not known at this time how they effect the nutrient budget of the lake.

2. Nonpoint sources -

The mean annual phosphorus loads from nonpoint sources were about 97.9% of the total reaching Lake Ouachita, 49.4% of the total reaching Lake Hamilton, and 46.3% of the total reaching Lake Catherine. Measured tributaries accounted for 77.4% of the total load to Lake Ouachita while minor tributaries contributed 20.5%. Gaged tributaries contributed 38.2% of the total load to Lake Hamilton and 45.7% to Lake Catherine while minor tributaries contributed 16.8% and 0.3% respectively.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake morphometry values were provided by the Arkansas Department of Pollution Control and Ecology. Tributary flow data were provided by the Arkansas District Office of the U.S. Geological Survey (USGS). Outlet drainage areas include lake surface areas. Mean hydraulic retention time was obtained by dividing the lake volumes by the mean flows of the appropriate outlets. Precipitation values are estimated by methods as outlined in National Eutrophication Survey (NES) Working Paper No. 175. A table of metric/English conversions is included as Appendix A.

A. Lake Morphometry:

		Ouachita	Hamilton	Catherine	
1.	Surface area:	162.28	24.28	7.85	km^2.
2.	Mean depth:	16.3	9.7	5.5	meters.
3.	Maximum depth:	45.7	21.3	18.3	meters.
4.	Volume:	2,653.237	234.363	43.172 x 10^6	m^3.
5.	Mean hydraulic retention time:	680 (1.86 yrs)	43	8	days.

B. Tributary and Outlet (see Appendix B for flow data):

1. Tributaries -

Lake Ouachita			Lake Hamilton			Lake Catherine		
Name	Drainage area (km^2)	Mean flow (m^3/sec)	Name	Drainage area (km^2)	Mean flow (m^3/sec)	Name	Drainage area (km^2)	Mean flow (m^3/sec)
A-2 Ouachita River	1,248.1	22.68	A-2 Ouachita River	2,861.9	45.16	A-2 Ouachita River	3,732.2	62.53
B-1 Walnut Creek	22.4	0.27	E-1 Little Mazarn Creek	115.0	2.32	C-1 Alpha Creek	129.5	2.10
C-1 Twin Creek	27.5	0.34	F-1 Mazarn Creek	204.9	4.25	D-1 Tigre Creek	32.1	0.51
D-1 South Fork Ouachita River	165.8	2.55	G-1 Hallmans Creek	61.6	1.23			
E-1 Muddy Creek	105.4	1.32	H-1 Glazypeau Creek	88.6	1.78			
F-1 Irons Fork	167.8	2.10	J-1 Bull Bayou	52.3	1.04			
G-1 North Fork	138.8	1.74						
Minor tributaries and immediate drainage -	823.6	12.60	Minor tributaries and immediate drainage -	323.5	7.08	Minor tributaries and immediate drainage -	24.8	0.32
Total	2,699.7	41.60	Total	3,707.8	62.76	Total	3,918.6	65.66

2. Outlet -

A-1 Ouachita River	2,861.9	45.16	A-1 Ouachita River	3,732.2	62.53	A-1 Ouachita River	3,918.4	65.82

C. Precipitation (in centimeters):

	Lake Ouachita	Lake Hamilton	Lake Catherine
1. Year of sampling -	186.6	192.1	192.1
2. Mean annual -	138.7	140.0	140.0

III. LAKE WATER QUALITY SUMMARY

Lakes Ouachita, Hamilton, and Catherine were sampled three times during the open-water season of 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from six, six, and four stations, respectively, on the lakes and from one or more depths at each station (see maps, pages v-vii). During each visit, depth-integrated samples were collected from each station for chlorophyll a analysis and phytoplankton identification and enumeration. During the first and last visits, 18.9-liter depth-integrated samples were composited for algal assays. Maximum depths sampled were:

	Ouachita	Hamilton	Catherine
Station	01 - 43.0 m	01 - 12.2 m	01 - 6.1 m
	02 - 41.8 m	02 - 3.7 m	02 - 3.0 m
	03 - 38.1 m	03 - 10.7 m	03 - 3.4 m
	04 - 21.0 m	04 - 16.8 m	04 - 16.8 m
	05 - 21.9 m	05 - 12.2 m	
	06 - 21.6 m	06 - 29.3 m	

For a more detailed explanation of NES methods, see NES Working Paper No. 175.

The results obtained are presented in full in Appendix C and are summarized in III-A for waters at the surface and at the maximum depth for each site. Results of the phytoplankton counts and chlorophyll a determinations are included in III-B. Results of the limiting nutrient study are presented in III-C.

OUACHITA
RET CODE 0514

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	(3/25/74) S*** = 6 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	(6/ 6/74) S*** = 6 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	(10/17/74) S*** = 6 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)												
0.-1.5 M DEPTH	9	11.5- 12.4	12.2	0.0- 1.5	12	23.7- 24.4	24.1	0.0- 1.5	12	20.7- 20.9	20.8	0.0- 1.5
MAX DEPTH**	6	7.6- 9.9	9.0	15.2- 42.7	6	8.2- 16.7	10.0	14.0- 43.0	6	9.0- 15.4	12.1	19.8- 41.8
DISSOLVED OXYGEN (MG/L)												
0.-1.5 M DEPTH	3	9.8- 10.0	10.0	1.5- 1.5	6	6.0- 8.4	7.4	1.5- 1.5	12	6.8- 7.4	7.0	0.0- 1.5
MAX DEPTH**	6	5.6- 8.6	7.2	15.2- 42.7	5	2.0- 5.2	3.0	14.0- 43.0	6	0.0- 2.4	0.3	19.8- 41.8
CONDUCTIVITY (UMHOS)												
0.-1.5 M DEPTH	9	38.- 140.	90.	0.0- 1.5	12	82.- 119.	98.	0.0- 1.5	12	57.- 72.	62.	0.0- 1.5
MAX DEPTH**	6	36.- 160.	67.	15.2- 42.7	6	71.- 113.	77.	14.0- 43.0	6	58.- 103.	79.	19.8- 41.8
PH (STANDARD UNITS)												
0.-1.5 M DEPTH	9	6.5- 7.3	7.0	0.0- 1.5	12	6.5- 7.9	6.7	0.0- 1.5	12	7.0- 7.4	7.1	0.0- 1.5
MAX DEPTH**	6	6.0- 6.6	6.4	15.2- 42.7	6	6.1- 6.7	6.4	14.0- 43.0	6	6.5- 6.8	6.6	19.8- 41.8
TOTAL ALKALINITY (MG/L)												
0.-1.5 M DEPTH	9	10.- 34.	16.	0.0- 1.5	12	17.- 40.	24.	0.0- 1.5	12	18.- 28.	23.	0.0- 1.5
MAX DEPTH**	6	10.- 37.	15.	15.2- 42.7	6	19.- 35.	24.	14.0- 43.0	6	21.- 42.	31.	19.8- 41.8
TOTAL P (MG/L)												
0.-1.5 M DEPTH	9	0.010-0.042	0.016	0.0- 1.5	12	0.010-0.061	0.017	0.0- 1.5	12	0.012-0.020	0.015	0.0- 1.5
MAX DEPTH**	6	0.010-0.025	0.016	15.2- 42.7	6	0.008-0.024	0.010	14.0- 43.0	6	0.019-0.142	0.035	19.8- 41.8
DISSOLVED ORTHO P (MG/L)												
0.-1.5 M DEPTH	9	0.013-0.017	0.015	0.0- 1.5	12	0.002-0.012	0.005	0.0- 1.5	12	0.002-0.005	0.002	0.0- 1.5
MAX DEPTH**	6	0.012-0.017	0.014	15.2- 42.7	6	0.002-0.009	0.006	14.0- 43.0	6	0.003-0.057	0.008	19.8- 41.8
NO2+NO3 (MG/L)												
0.-1.5 M DEPTH	9	0.040-0.140	0.170	0.0- 1.5	12	0.020-0.080	0.050	0.0- 1.5	12	0.020-0.060	0.020	0.0- 1.5
MAX DEPTH**	6	0.140-0.240	0.195	15.2- 42.7	6	0.130-0.290	0.200	14.0- 43.0	6	0.020-0.230	0.020	19.8- 41.8
AMMONIA (MG/L)												
0.-1.5 M DEPTH	3	0.020-0.040	0.030	0.0- 1.5	12	0.030-0.050	0.040	0.0- 1.5	12	0.020-0.050	0.040	0.0- 1.5
MAX DEPTH**	6	0.020-0.080	0.030	15.2- 42.7	6	0.020-0.110	0.030	14.0- 43.0	6	0.020-1.370	0.480	19.8- 41.8
KJELDAHL N (MG/L)												
0.-1.5 M DEPTH	9	0.200-0.500	0.200	0.0- 1.5	12	0.200-0.800	0.300	0.0- 1.5	12	0.200-0.500	0.200	0.0- 1.5
MAX DEPTH**	6	0.200-0.300	0.200	15.2- 42.7	6	0.200-0.300	0.200	14.0- 43.0	6	0.200-1.300	0.550	19.8- 41.8
SECCHI DISC (METERS)												
	6	1.1- 4.3	2.8		6	0.1- 3.8	2.4		6	2.4- 6.3	3.0	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

Reproduced from best available copy.

LAKE HAMILTON
STORET CODE 0510

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	(3/21/74) S*** = 6				(6/ 5/74) S*** = 6				(10/15/74) S*** = 6			
	N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)												
0.-1.5 M DEPTH	12	12.6- 14.1	13.4	0.0- 1.5	12	24.9- 26.3	25.4	0.0- 1.5	12	19.9- 20.9	20.3	0.0- 1.5
MAX DEPTH**	6	9.9- 13.4	11.8	1.5- 15.2	6	15.2- 24.1	18.7	3.7- 29.0	6	16.6- 19.7	17.7	3.0- 28.3
DISSOLVED OXYGEN (MG/L)												
0.-1.5 M DEPTH	6	9.4- 12.6	10.1	1.5- 1.5	6	7.0- 10.0	7.5	1.5- 1.5	12	6.8- 9.2	8.0	0.0- 1.5
MAX DEPTH**	6	9.0- 10.8	9.9	1.5- 15.2	6	0.8- 6.6	4.8	3.7- 29.0	6	0.6- 6.0	3.9	3.0- 28.3
CONDUCTIVITY (UMHOS)												
0.-1.5 M DEPTH	12	120.- 180.	145.	0.0- 1.5	12	46.- 77.	51.	0.0- 1.5	12	32.- 125.	37.	0.0- 1.5
MAX DEPTH**	6	120.- 240.	140.	1.5- 15.2	5	35.- 53.	49.	3.7- 29.0	6	29.- 39.	33.	3.0- 28.3
PH (STANDARD UNITS)												
0.-1.5 M DEPTH	12	6.7- 9.2	7.2	0.0- 1.5	12	6.5- 9.5	7.0	0.0- 1.5	12	7.0- 8.2	7.3	0.0- 1.5
MAX DEPTH**	6	6.5- 7.0	6.7	1.5- 15.2	6	6.3- 8.0	5.5	3.7- 29.0	6	6.7- 7.0	6.8	3.0- 28.3
TOTAL ALKALINITY (MG/L)												
0.-1.5 M DEPTH	12	10.- 24.	16.	0.0- 1.5	12	13.- 20.	19.	0.0- 1.5	12	10.- 25.	15.	0.0- 1.5
MAX DEPTH**	6	13.- 27.	15.	1.5- 15.2	6	15.- 24.	21.	3.7- 29.0	6	13.- 28.	17.	3.0- 28.3
TOTAL P (MG/L)												
0.-1.5 M DEPTH	12	0.015-0.058	0.018	0.0- 1.5	12	0.034-0.051	0.040	0.0- 1.5	12	0.014-0.081	0.018	0.0- 1.5
MAX DEPTH**	6	0.013-0.085	0.015	1.5- 15.2	6	0.020-0.077	0.040	3.7- 29.0	6	0.016-0.090	0.021	3.0- 28.3
DISSOLVED ORTHO P (MG/L)												
0.-1.5 M DEPTH	12	0.012-0.018	0.015	0.0- 1.5	12	0.003-0.017	0.006	0.0- 1.5	12	0.002-0.032	0.003	0.0- 1.5
MAX DEPTH**	6	0.012-0.047	0.014	1.5- 15.2	6	0.002-0.028	0.007	3.7- 29.0	6	0.002-0.009	0.005	3.0- 28.3
NO2+NO3 (MG/L)												
0.-1.5 M DEPTH	12	0.050-0.090	0.060	0.0- 1.5	12	0.050-0.130	0.085	0.0- 1.5	12	0.010-0.650	0.020	0.0- 1.5
MAX DEPTH**	6	0.070-0.320	0.110	1.5- 15.2	6	0.120-0.180	0.170	3.7- 29.0	6	0.020-0.120	0.075	3.0- 28.3
AMMONIA (MG/L)												
0.-1.5 M DEPTH	12	0.030-0.040	0.040	0.0- 1.5	12	0.030-0.100	0.055	0.0- 1.5	12	0.020-0.620	0.020	0.0- 1.5
MAX DEPTH**	6	0.030-0.380	0.045	1.5- 15.2	6	0.050-0.260	0.135	3.7- 29.0	6	0.020-0.240	0.100	3.0- 28.3
KJELDAHL N (MG/L)												
0.-1.5 M DEPTH	12	0.200-0.800	0.400	0.0- 1.5	12	0.200-0.700	0.450	0.0- 1.5	12	0.300-1.200	0.400	0.0- 1.5
MAX DEPTH**	6	0.200-0.700	0.200	1.5- 15.2	6	0.200-0.500	0.350	3.7- 29.0	6	0.200-0.700	0.450	3.0- 28.3
SECCHI DISC (METERS)												
	6	1.0- 3.0	2.0		6	1.1- 1.8	1.6		6	1.5- 2.4	1.9	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	(3/20/74) S*** = 4				(6/ 5/74) S*** = 4				(10/15/74) S*** = 4			
	N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)												
0.-1.5 M DEPTH	5	11.6- 15.6	13.2	0.0- 1.5	8	17.8- 23.4	21.3	0.0- 1.5	8	17.1- 22.0	19.4	0.0- 1.5
MAX DEPTH**	4	11.6- 13.6	12.1	0.0- 12.2	4	17.8- 20.6	19.8	1.5- 15.2	4	17.0- 20.5	18.1	3.0- 16.8
DISSOLVED OXYGEN (MG/L)												
0.-1.5 M DEPTH	3	9.4- 13.0	10.6	0.0- 1.5	4	5.2- 8.2	7.1	1.5- 1.5	8	4.4- 7.6	6.3	0.0- 1.5
MAX DEPTH**	3	9.2- 13.0	9.2	0.0- 12.2	4	5.4- 8.2	6.5	1.5- 15.2	4	3.2- 7.6	5.7	3.0- 16.8
CONDUCTIVITY (UMHOS)												
0.-1.5 M DEPTH	6	41.- 131.	69.	0.0- 1.5	8	42.- 134.	52.	0.0- 1.5	8	29.- 72.	53.	0.0- 1.5
MAX DEPTH**	3	41.- 171.	41.	0.0- 12.2	4	42.- 192.	52.	1.5- 15.2	4	30.- 67.	52.	3.0- 16.8
PH (STANDARD UNITS)												
0.-1.5 M DEPTH	6	6.7- 8.2	7.8	0.0- 1.5	8	6.6- 7.7	6.6	0.0- 1.5	8	6.7- 7.1	6.9	0.0- 1.5
MAX DEPTH**	3	6.8- 8.2	6.8	0.0- 12.2	4	6.6- 7.2	6.7	1.5- 15.2	4	6.8- 7.2	6.7	3.0- 16.8
TOTAL ALKALINITY (MG/L)												
0.-1.5 M DEPTH	6	16.- 23.	20.	0.0- 1.5	8	14.- 17.	16.	0.0- 1.5	8	16.- 33.	18.	0.0- 1.5
MAX DEPTH**	3	14.- 21.	20.	0.0- 12.2	4	13.- 16.	14.	1.5- 15.2	4	16.- 30.	17.	3.0- 16.8
TOTAL P (MG/L)												
0.-1.5 M DEPTH	6	0.023-0.047	0.027	0.0- 1.5	8	0.022-0.066	0.050	0.0- 1.5	8	0.019-0.036	0.025	0.0- 1.5
MAX DEPTH**	3	0.020-0.051	0.047	0.0- 12.2	4	0.045-0.095	0.053	1.5- 15.2	4	0.014-0.040	0.030	3.0- 16.8
DISSOLVED ORTHO P (MG/L)												
0.-1.5 M DEPTH	6	0.014-0.020	0.018	0.0- 1.5	8	0.003-0.025	0.011	0.0- 1.5	8	0.003-0.006	0.004	0.0- 1.5
MAX DEPTH**	3	0.014-0.022	0.016	0.0- 12.2	4	0.003-0.025	0.012	1.5- 15.2	4	0.003-0.005	0.004	3.0- 16.8
NO2+NO3 (MG/L)												
0.-1.5 M DEPTH	6	0.050-0.180	0.145	0.0- 1.5	8	0.110-0.250	0.170	0.0- 1.5	8	0.030-0.100	0.060	0.0- 1.5
MAX DEPTH**	3	0.050-0.150	0.120	0.0- 12.2	4	0.060-0.230	0.195	1.5- 15.2	4	0.020-0.100	0.065	3.0- 16.8
AMMONIA (MG/L)												
0.-1.5 M DEPTH	6	0.030-2.260	0.745	0.0- 1.5	8	0.040-1.780	0.105	0.0- 1.5	8	0.020-0.080	0.060	0.0- 1.5
MAX DEPTH**	3	0.030-3.560	0.040	0.0- 12.2	4	0.040-0.080	0.065	1.5- 15.2	4	0.040-0.140	0.050	3.0- 16.8
KJELDAHL N (MG/L)												
0.-1.5 M DEPTH	6	0.200-2.400	1.000	0.0- 1.5	8	0.200-1.600	0.300	0.0- 1.5	8	0.300-1.200	0.400	0.0- 1.5
MAX DEPTH**	3	0.200-3.700	0.400	0.0- 12.2	4	0.200-0.300	0.200	1.5- 15.2	4	0.300-0.500	0.350	3.0- 16.8
SECCHI DISC (METERS)	4	1.1- 1.4	1.4		4	0.9- 1.1	0.9		4	0.9- 1.5	1.4	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

B. Biological Characteristics:

1. Phytoplankton -

Ouachita

Sampling Date	Dominant Genera	Algal Units per ml
03/25/74	1. Cryptomonas	110
	2. Chroomonas	73
	3. Centric diatoms	37
	Other genera	---
	Total	220
06/06/74	1. Fragilaria	797
	2. Melosira	728
	3. Chroomonas	693
	4. Tabellaria	520
	5. Asterionella	104
	Other genera	173
	Total	3,015
10/17/74	1. Lyngbya	266
	2. Chroomonas	233
	3. Anhanizomenon	200
	4. Dactylococcopsis	200
	5. Microcystis	167
	Other genera	633
	Total	1,699

Hamilton

Sampling Date	Dominant Genera	Algal Units per ml
03/27/74	1. Centric diatoms	2,543
	2. Melosira	831
	3. Nitzschia	294
	4. Ankistrodesmus	293
	5. Cryptomonas	245
	Other genera	440
	Total	4,646
06/05/74	1. Lyngbya	528
	2. Merismopedia	302
	3. Melosira	226
	4. Dactylococcopsis	189
	5. Anabaena	188
	Other genera	605
	Total	2,038
10/15/74	1. Dactylococcopsis	1,976
	2. Stephanodiscus	553
	3. Cryptomonas	435
	4. Scenedesmus	318
	5. Lyngbya	237
	Other genera	2,094
	Total	5,613

B. Biological Characteristics (continued):

1. Phytoplankton -

Catherine

Sampling Date	Dominant Genera	Algal Units per ml
03/26/74	1. Melosira	2,272
	2. Skeletonema	1,386
	3. Cyclotella	501
	4. Flagellate	462
	5. Chroomonas	424
	Other genera	1,309
	Total	6,354
06/05/74	1. Skeletonema	3,885
	2. Chroomonas	226
	3. Melosira	181
	4. Centric diatoms	181
	5. Pennate diatoms	158
	Other genera	541
	Total	5,172
10/15/74	1. Scenedesmus	517
	2. Pennate diatoms	487
	3. Nitzschia	457
	4. Melosira	244
	5. Dactylococcopsis	213
	Other genera	640
	Total	2,558

B. Biological Characteristics:

2. Chlorophyll a - Lake Ouachita, Lake Hamilton, Lake Catherine

Lake Ouachita			Lake Hamilton			Lake Catherine		
Sampling Date	Station Number	Chlorophyll a (µg/l)	Sampling Date	Station Number	Chlorophyll a (µg/l)	Sampling Date	Station Number	Chlorophyll a (µg/l)
03/25/74	01	0.4	03/27/74	01	3.3	03/26/74	01	4.7
	02	0.8		02	5.1		02	24.9
	03	1.6		03	3.7		03	11.7
	04	4.3		04	6.7		04	7.7
	05	1.6		05	21.4			
	06	4.8		06	9.8			
06/06/74	01	3.7	06/05/74	01	8.0	06/05/74	01	1.9
	02	3.4		02	7.8		02	35.7
	03	3.0		03	14.3		03	4.6
	04	4.4		04	6.9		04	12.4
	05	3.5		05	27.7			
	06	3.4		06	21.7			
10/17/74	01	2.6	10/15/74	01	6.6	10/15/74	01	2.0
	02	3.2		02	7.4		02	17.0
	03	7.9		03	7.9		03	30.1
	04	9.5		04	8.6		04	15.8
	05	7.8		05	17.4			
	06	12.3		06	11.7			

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike(mg/l)	Lake Ouachita			Lake Hamilton			Lake Catherine		
	a. 03/25/74			a. 03/27/74			a. 03/26/74		
	Ortho P Conc.(mg/l)	Inorganic N Conc.(mg/l)	Maximum Yield (mg/l-dry wt.)	Ortho P Conc.(mg/l)	Inorganic N Conc.(mg/l)	Maximum Yield (mg/l-dry wt.)	Ortho P Conc.(mg/l)	Inorganic N Conc.(mg/l)	Maximum Yield (mg/l-dry wt.)
	Stations 01-03			Stations 01-03					
Control	0.010	0.169	0.1	0.015	0.118	0.7	0.004	0.727	1.0
0.05 P	0.060	0.169	2.8	0.065	0.118	4.5	0.054	0.727	21.5
0.05 P + 1.0 N	0.060	1.169	18.5	0.065	1.118	27.3	0.054	1.727	23.7
1.00 N	0.010	1.169	0.1	0.015	1.118	0.1	0.004	1.727	0.8
	Stations 04-06			Station 05					
Control	0.015	0.132	0.4	0.030	0.323	10.2			
0.05 P	0.065	0.132	5.9	0.080	0.323	10.6			
0.05 P + 1.0 N	0.065	1.132	25.8	0.080	1.323	32.5			
1.00 N	0.015	1.132	0.5	0.030	1.323	19.4			
	b. 10/17/74			b. 10/15/74			b. 10/15/74		
	Stations 01-03			Stations 01-03					
Control	0.005	0.076	0.3	0.005	0.084	0.4	0.010	0.104	0.7
0.05 P	0.055	0.076	3.1	0.055	0.084	1.6	0.060	0.104	3.2
0.05 P + 1.0 N	0.055	1.076	13.0	0.055	1.084	13.9	0.060	1.104	18.9
1.00 N	0.005	1.076	0.2	0.005	1.084	0.4	0.010	1.104	0.8
	Stations 04-06								
Control	0.005	0.133	0.6						
0.05 P	0.055	0.133	5.3						
0.05 P + 1.0 N	0.055	1.133	13.8						
1.00 N	0.005	1.133	0.4						

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential for primary production was moderate to high in Lakes Ouachita and Catherine at the times of sampling. Increased growth of the test alga in response to an addition of orthophosphorus suggests that the lakes were phosphorus limited when sampled. Spikes with nitrogen and orthophosphorus simultaneously resulted in maximum yield. The addition of nitrogen alone did not stimulate growth significantly beyond the control yield.

The N/P ratios of 14/1 (Stations 01-03) and 12/1 (Stations 04-06) indicate near-colimitation during the spring sampling on Lake Ouachita. The N/P ratios of 24/1 in the summer and 41/1 (Stations 01-03) and 18/1 (Stations 04-06) in the fall suggest phosphorus limitation.

The N/P ratios of 68/1 in the spring, 40/1 in the summer, and 36/1 in the fall on Lake Catherine also suggest phosphorus limitation.

The potential for primary productivity was moderately high in Lake Hamilton during the spring and fall sampling at Stations 01-03, and phosphorus limitation was indicated by the increased growth responses of the test alga to nutrient spikes. Potential for primary production was extremely high, however, at Station 05

in Lake Hamilton during spring. Station 05 is located at the mouth of Hot Springs Creek, which is impacted by both municipal and industrial sources in the city of Hot Springs. It is possible that this high growth potential, as well as the apparent nitrogen limitation at that station, are attributable to excessive phosphorus discharges from the known point sources in Hot Springs.

The N/P ratios of 9/1 (Stations 01-03), 8/1 (Stations 04-06) in the spring, 21/1 in the summer, 24/1 (Stations 01-03) and 18/1 (Stations 04-06) suggest nitrogen limitation in the spring and phosphorus limitation in the summer and fall.

IV. NUTRIENT LOADINGS
(See Appendix D for data)

For the determination of nutrient loadings, the Arkansas National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the maps (pages v-vii), except for the high runoff months of March and April when two samples were collected. Sampling was begun in June 1974, and was completed in May 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Arkansas District Office of the USGS for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a USGS computer program for calculating stream loadings. Nutrient loads indicated for tributaries are those measured minus known point source loads, if any.

Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of USGS) to Ouachita Lake were estimated by averaging the mean annual nutrient loads, in $kg/km^2/yr$, from Stations B-1, C-1, D-1, E-1, and F-1, and multiplying that by the ZZ area in km^2.

Loadings for ZZ's on Lake Hamilton were estimated in a similar manner using the mean annual nutrient loads at Stations E-1, F-1, and G-1.

Loadings for ZZ's and Gulpha Creek on Lake Catherine were estimated by using the mean annual nutrient load at Station D-1.

In this report, populations served by wastewater treatment facilities as provided by the Arkansas Department of Pollution Control and Ecology (1975), were back-calculated from flows provided, based upon 100 gal/capita/day (0.3785 m^3/capita/day). The operators of the Mount Ida (Lake Ouachita), Mountain Pine and Hot Springs (Lake Hamilton), and Hot Springs (Lake Catherine) wastewater treatment plant provided monthly effluent samples and corresponding flow data. Nutrient loads for the remaining municipal wastewater treatment plants to all three lakes were estimated at 1.134 kg P and 3.401 kg N/capita/yr.

Nutrient loads for Gram Motel (Lake Hamilton) were estimated based upon 80% occupancy of 350 beds during a third of the year. Nutrient loads for Lakeside Public School were estimated on a base of 195 people during 180 days of the year.

A. Waste Sources:

1. Known municipal* -

Name	Population Served*	Treatment*	Mean Flow ($m^3/d \times 10^3$)	Receiving Water
Lake Ouachita				
Mount Ida	800	Stabilization pond	0.409	South Fork Ouachita R
Ouachita Job Corps	130	?	0.049	Lake Ouachita
Lake Hamilton				
Mount Pine	1,150	Stabilization pond	0.527	Glazypeau Creek
Hot Springs	28,300	Trickling filter	10.711	Hot Springs Creek
Green Haven (Hot Springs)	260	Extended aeration	0.099	Stokes Creek
John Adams Apartment Complex	300	Extended aeration	0.114	Lake Hamilton
Gram Motel	350 beds	Extended aeration	0.132	Lake Hamilton
KI-V Travel Trailer Park	88	Sand filter	0.033	Rush Creek
Shady Hills Mobile Home Park	125	Stabilization pond	0.047	Stokes Creek
Pretti Point Mobile Home Park	38	Extended aeration	0.014	Lake Hamilton
Kleinshore Resort	190	Extended aeration	0.072	Lake Hamilton
Timbercrest Mobile Home Park	160	Extended aeration	0.061	Lake Hamilton
Holiday Inn	1,000	Extended aeration	0.378	Lake Hamilton
Twin Points Condominiums	90	Extended aeration	0.034	Lake Hamilton
J.O. Burris Subdivision	140	Extended aeration	0.053	Molly Creek
Fairwood Subdivision	480	Extended aeration	0.182	Bull Bayou
Wallmart Department Store	200	?	0.076	Molly Creek
Anthony Island Resort	65	Extended aeration	0.025	Lake Hamilton
Blakely Mountain Dam	30	?	0.011	Ouachita River
Lake Catherine				
Hot Springs	7,000	Trickling filter	2.650	Gulpha Creek
Hot Springs (Bellaire)	25,631	Extended aeration	9.701	Gulpha Creek
Lakeside Public School	195	Stabilization pond	0.074	Mill Creek to Middle Branch Gulpha Creek
Trails Inn Inc.	161	Extended aeration	0.061	Gulpha Creek
Eastgate Subdivision	4,200	Stabilization pond	1.590	Gulpha Creek
Bratton Mobile Home Park	100	?	0.038	Middle Branch Gulpha Creek
Subdivision South of Ridgeway	210	?	0.079	Gulpha Creek

*Plant information provided by the Arkansas Department of Pollution Control and Ecology (1975), treatment plant questionnaires and/or plant operators. Flows for all municipal plants are equivalent to 0.3785 m^3/capita/day.

2. Known industrial* -

Name	Product	Treatment	Mean Flow ($m^3/d \times 10^6$)	Receiving Water
Lake Ouachita - None				
Lake Hamilton				
National Rejectors	Currency and Coin Equipment	pH neutralization and flocculation	0.[illegible]6	Stokes Creek
Hot Springs Aluminum Products	Recycled Aluminum Products	pH neutralization and flocculation	0.397	Hot Springs Creek
Weyerhauser	Plywood	Stabilization pond	1.809	Glazypeau Creek
Weyerhauser	Plywood	?	0.712	Glazypeau Creek
Dixiart	Metal Plating	Ion exchange	0.034	Hot Springs Creek
Lake Catherine				
Union Carbide West	Vanadium Oxide	Stabilization pond	8.933	Lake Catherine
Union Carbide East	Vanadium Oxide	Stabilization pond	7.063	Lake Catherine
Red Diamond Battery Mfg.	Batteries	Septic tanks	0.053	Lake Catherine
Featherlite Company (sewage effluent)	Aluminum Screen Doors	Extended aeration	0.095	Lake Catherine
Featherlite Company (processing effluent)	Aluminum Screen Doors	Extended aeration	0.314	Lake Catherine
General Cable Corp.	Aluminum Wire Cable	Extended aeration	0.848	Lake Catherine
Timex	Watches-Clocks	Extended aeration	0.098	Lake Catherine
Hot Springs Meat Packing Company	Meat Products	Stabilization pond	0.030	Gulpha Creek
Arkansas Abrasives	Cutting Whetstones	Earth Settling Ponds in series	0.019	Gulpha Creek

*Plant information provided by the Arkansas Department of Pollution Control and Ecology (1975), treatment plant questionnaires and/or plant operators. Flows for all municipal plants are equivalent to 0.3785 m^3/capita/day.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Lake Ouachita			Lake Hamilton			Lake Catherine		
Source	kg P/yr	% of total	Source	kg P/yr	% of total	Source	kg P/yr	% of total
a. Tributaries (nonpoint load) -			Tributaries (nonpoint load) -			Tributaries (nonpoint load)-		
A-2 Ouachita River	13,840	49.3	A-2 Ouachita River	23,445	32.7	A-2 Ouachita River	34,035	43.2
B-1 Walnut Creek	215	0.8	E-1 Little Mazarn Creek	2,215	3.1	C-1 Gulpha Creek	1,555	2.0
C-1 Twin Creek	180	0.6	F-1 Mazarn Creek	2,320	3.2	D-1 Tigre Creek	385	0.5
D-1 South Fork Ouachita River	1,420	5.1	G-1 Hallmans Creek	740	1.0			
E-1 Muddy Creek	835	3.0	H-1 Glazypeau Creek	1,305	1.8			
F-1 Irons Fork	1,505	5.4	J-1 Bull Bayou	460	0.6			
G-1 North Fork	870	3.1						
b. Minor tributaries and immediate drainage (nonpoint load) -	5,765	20.5	Minor tributaries and immediate drainage (nonpoint load) -	4,530	6.3	Minor tributaries and immediate drainage (nonpoint load) -	300	0.4
c. Known municipal STP's -			Known municipal STP's -			Known municipal STP's -		
Mount Ida	445	1.6	Mount Pine	400	0.6	Hot Springs	7,940	10.1
Ouachita Job Corps	145	0.5	Hot Springs	32,090	44.7	Hot Springs (Bellaire)	29,065	36.9
			Green Haven (Hot Springs)	300	0.4	Lakeside Public School	110	0.1
			John Adams Apartment Complex	340	0.5	Trails Inn Inc.	180	0.2
			Gram Motel	105	0.2	Eastgate Subdivision	4,760	6.0
			KI-V Travel Trailer Park	100	0.1	Bratton Mobile Home Park	115	0.1
			Shady Hills Mobile Home Park	140	0.2	Subdivision South of Ridgeway	240	0.3
			Pretti Point Mobile Home Park	45	0.1			
			Kleinshore Resort	215	0.3			
			Timbercrest Mobile Home Park	180	0.3			
			Holiday Inn	1,135	1.6			
			Twin Points Condominiums	100	0.1			
			J.O. Burris Subdivision	160	0.2			
			Fairwood Subdivision	545	0.8			
			Wallmart	225	0.3			
			Anthony Island Resort	75	0.1			
			Blakely Mountain Dam	35	0.1			
d. Septic tanks* -	10	<0.1	Septic tanks* -	75	0.1	Septic tanks* -	15	<0.1
e. Known industrial - None			Known industrial - See page 15.	?		Known industrial - See page 15.	?	
f. Direct precipitation** -	2,840	10.1	Direct precipitation** -	425	0.6	Direct precipitation** -	135	0.2
Totals	28,070	100.0	Totals	71,705	100.0	Totals	78,835	100.0
2. Output - A-1 Ouachita River	23,445		A-1 Ouachita River	34,035		A-1 Ouachita River	49,340	
3. Net annual P accumulation -	4,625		Net annual P accumulation -	37,670		Net annual P accumulation -	29,495	

*Estimate for Ouachita Lake based on 14 lakeside residences, 2 parks, and 3 camps.
Estimate for Hamilton Lake based on 267 lakeside residences.
Estimate for Catherine Lake based on 55 lakeside residences and 1 park.

1. Inputs -

Lake Ouachita			Lake Hamilton			Lake Catherine		
Source	kg N/yr	% of total	Source	kg N/yr	% of total	Source	kg N/yr	% of total
a. Tributaries (nonpoint load) -			Tributaries (nonpoint load) -			Tributaries (nonpoint load) -		
A-2 Ouachita River	356,235	48.3	A-2 Ouachita River	555,150	62.1	A-2 Ouachita River	1,008,320	84.8
B-1 Walnut Creek	1,975	0.3	E-1 Little Mazarn Creek	48,495	5.3	C-1 Gulpha Creek	30,690	2.6
C-1 Twin Creek	2,790	0.4	F-1 Mazarn Creek	38,485	4.2	D-1 Tigre Creek	7,605	0.6
D-1 South Fork Ouachita River	30,415	4.1	G-1 Hallmans Creek	9,825	1.1			
E-1 Muddy Creek	18,285	2.5	H-1 Glazypeau Creek	20,100	2.2			
F-1 Irons Fork	28,065	3.8	J-1 Bull Bayou	7,870	0.9			
G-1 North Fork	20,600	2.8						
b. Minor tributaries and immediate drainage (nonpoint load) -	101,305	13.7	Minor tributaries and immediate drainage (nonpoint load) -	82,815	9.1	Minor tributaries and immediate drainage (nonpoint load) -	5,880	0.5
c. Known municipal STP's -			Known municipal STP's -			Known municipal STP's -		
Mount Ida	1,095	0.1	Mount Pine	835	0.1	Hot Springs	23,805	2.0
Ouachita Job Corps	440	0.1	Hot Springs	96,250	10.6	Hot Springs (Bellaire)	87,170	7.3
			Green Haven (Hot Springs)	890	0.1	Lakeside Public School	325	<0.1
			John Adams Apartment Complex	1,020	0.1	Trails Inn Inc.	550	0.1
			Gram Motel	315	<0.1	Eastgate Subdivision	14,285	1.2
			KI-Y Travel Trailer Park	300	<0.1	Bratton Mobile Home Park	340	<0.1
			Shady Hills Mobile Home Park	425	<0.1	Subdivision South of Ridgeway	715	0.1
			Pretti Point Mobile Home Park	130	<0.1			
			Kleinshore Resort	645	0.1			
			Timbercrest Mobile Home Park	545	0.1			
			Holiday Inn	3,400	0.4			
			Twin Points Condominiums	305	<0.1			
			J.O. Burris Subdivision	475	0.1			
			Fairwood Subdivision	1,630	0.2			
			Wallmart	680	0.1			
			Anthony Island Resort	220	<0.1			
			Blakely Mountain Dam	100	<0.1			
d. Septic tanks* -	430	0.1	Septic tanks* -	2,845	0.3	Septic tanks* -	820	0.1
e. Known industrial - None			Known industrial - See page 15.	?		Known industrial - See page 15.	?	
f. Direct precipitation** -	175,195	23.8	Direct precipitation** -	26,215	2.9	Direct precipitation** -	8,475	0.7
Totals	736,830	100.0	Totals	909,965	100.0	Totals	1,188,780	100.0
2. Output - A-1 Ouachita River	565,150		A-1 Ouachita River	1,008,320		A-1 Ouachita River	1,735,280	
3. Net annual N accumulation -	171,680		Net annual N export*** -	98,355		Net annual N export*** -	546,500	

*Estimate for Ouachita Lake based on 14 lakeside residences, 2 parks, and 3 camps.
Estimate for Hamilton Lake based on 267 lakeside residences.
Estimate for Catherine Lake based on 55 lakeside residences and 1 park.
**Estimated (see NES Working Paper No. 175).
***Export probably due to unknown sources and/or sampling error.

D. Mean Annual Nonpoint Nutrient Export by Sub-drainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Lake Ouachita		
Ouachita River	11	285
Walnut Creek	10	88
Twin Creek	7	101
South Fork Ouachita River	9	183
Muddy Creek	8	173
Irons Fork	9	167
North Fork	6	148
Lake Hamilton		
Ouachita River	8	197
Little Mazarn Creek	19	422
Mazarn Creek	11	188
Hallmans Creek	12	159
Glazypeau Creek	15	227
Bull Bayou	9	150
Lake Catherine		
Ouachita River	9	270
Gulpha Creek	12	237
Tyre Creek	12	237

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P (mg/l)	Mean Total N (mg/l)
Lake Ouachita		
H-1 Daley Creek	0.018	0.720
J-1 Big Blakely Creek	0.020	0.266
K-1 Little Blakely Creek	0.028	0.387
Lake Hamilton		
C-1 Mt. Carmel Creek	0.027	0.342
D-1 Fourche a Loupe Creek	0.012	0.437
H-2 Glazypeau Creek	0.022	9.141
K-1 Hot Springs Creek	0.969	7.786
K-2 Hot Springs Creek	0.092	0.236
Lake Catherine		
B-1 Cooper Creek	0.014	0.255

Phosphorus levels for the ungaged tributaries to Lake Ouachita are in line with those levels observed in the gaged tributaries (see Appendix D). Nitrogen levels for tributaries J-1 and K-1 are low, comparable to tributaries B-1 and C-1 entering the lake and higher for tributary H-1 than for the gaged streams.

Nutrient levels for ungaged tributaries C-1 and D-1 to Lake Hamilton are consistent with those levels found in the gaged tributaries. Phosphorus levels in tributaries K-1 and K-2 are above those found in the gaged; this fact may be attributable to the impact of the Hot Springs STP in tributary K-1 and presence of two industrial plants on K-2.

Nutrient levels for the ungaged tributary to Lake Catherine are in line with those levels found in the gaged tributaries.

F. Yearly Loadings:

In the following table, the existing phosphorus annual loading is compared to the relationship proposed by Vollenweider (1975). Essentially, his eutrophic loading is that at which the receiving waters would become eutrophic or remain eutrophic; his oligotrophic loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between eutrophic and oligotrophic.

Note that Vollenweider's model may not apply to lakes with short hydraulic retention times or in which ligh penetration is severely restricted by high concentrations of suspended solids in the surface waters.

Total Yearly Phosphorus Loading ($g/m^2/yr$)

	Ouachita	Hamilton	Catherine
Estimate loading for Lakes	0.17	2.95	10.04
Vollenweider's eutrophic loading	0.59	1.72	3.09
Vollenweider's oligotrophic loading	0.29	0.86	1.54

V. LITERATURE REVIEWED

Bryant, C. T. 1975, Waste Load Allocation Studies for Arkansas Streams, Ouachita River Basin Segment 2F. Arkansas Department of Pollution Control and Ecology, United States Department of the Interior Geological Survey, Little Rock, Arkansas.

Nix, J. 1971, Distribution of Trace Elements in Impoundments. Arkansas Water Resources Research Center, University of Arkansas and Ouachita Baptist University.

U.S. Environmental Protection Agency. 1975. National Eutrophication Survey Methods 1973-1976. Working Paper No. 175. National Environmental Research Center, Las Vegas, Nevada, and Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

Vollenweider, R. A. 1975. Input-Output Models With Special Reference to the Phosphorus Loading Concept in Limnology. Schweiz. Z. Hydrol. 37:53-84.

VI. APPENDICES

APPENDIX A

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX B

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0514 OUACHITA LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 2861.9

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
0514A1	2861.9	52.10	48.87	35.08	45.05	56.38	45.05	37.75	47.86	46.16	46.78	34.57	46.27	45.16
0514A2	1248.4	34.46	42.29	48.08	38.91	36.84	11.04	0.68	3.20	7.45	6.40	15.74	22.43	22.68
0514B1	22.4	0.419	0.513	0.583	0.473	0.442	0.133	0.082	0.040	0.091	0.079	0.190	0.272	0.275
0514C1	27.5	0.513	0.629	0.714	0.578	0.547	0.164	0.099	0.048	0.110	0.096	0.232	0.334	0.337
0514D1	165.8	3.74	4.70	5.24	4.25	4.13	0.94	0.95	0.37	1.05	0.95	2.13	2.35	2.55
0514E1	105.4	2.00	2.46	2.79	2.26	2.14	0.64	0.39	0.19	0.43	0.37	0.91	1.30	1.32
0514F1	167.8	3.20	3.94	4.42	3.62	3.43	1.03	0.62	0.30	0.69	0.59	1.46	2.08	2.10
0514G1	138.8	2.64	3.23	3.68	2.97	2.83	0.82	0.51	0.25	0.57	0.49	1.21	1.72	1.74
0514ZZ	985.9	19.14	23.50	26.70	21.61	20.47	6.14	3.71	1.78	4.13	3.57	8.75	12.46	12.60

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 2861.9
SUM OF SUB-DRAINAGE AREAS = 2861.9

TOTAL FLOW IN = 525.82
TOTAL FLOW OUT = 541.93

41

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0514A1	6	74	176.131	23	266.178				
	7	74	58.333	20	39.927	21	24.607		
	8	74	11.355	18	4.587				
	9	74	44.741	22	57.200				
	10	74	50.687	20	28.600				
	11	74	95.711	10	13.224				
	12	74	127.143	14	185.759				
	1	75	63.996	26	38.228				
	2	75	90.897	16	21.606				
	3	75	89.198	9	66.261	23	58.616		
	4	75	126.293	27	93.729				
	5	75	89.198						
0514A2	6	74	87.499	23	5.663				
	7	74	7.702						
	8	74	10.817	18	3.3[illegible]				
	9	74	21.974	22	53.802				
	10	74	2.860	20	3.964				
	11	74	80.137	10	155.743				
	12	74	30.582	14	84.951				
	1	75	21.521	26	9.628				
	2	75	59.465	15	11.327	16	11.327		
	3	75	87.499	9	9.203	23	32.564		
	4	75	24.409	12	83.818				
	5	75	41.484						

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0514 OUACHITA LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
051401	6	74	1.572	23	0.2e3				
	7	74	0.139	21	0.113				
	8	74	0.193	18	0.170				
	9	74	0.394	22	0.623				
	10	74	0.051	20	0.198				
	11	74	1.438	10	0.963				
	12	74	0.547	15	1.416				
	1	75	0.385	26	0.255				
	2	75	1.065	16	0.170				
	3	75	1.569	9	0.283	23	0.538		
	4	75	0.439	5	1.472	12	1.501		
	5	75	0.745						
0514C1	6	74	1.526	23	0.368				
	7	74	0.170	21	0.079				
	8	74	0.238	18	0.142				
	9	74	0.484	22	1.557				
	10	74	0.862	20	0.170				
	11	74	1.764	10	3.398				
	12	74	0.668	15	1.699				
	1	75	0.473	26	0.311				
	2	75	1.308	16	0.227				
	3	75	1.923	9	0.368	23	1.076		
	4	75	0.538	5	1.821	13	1.841	27	0.906
	5	75	0.912						
051401	6	74	6.513	23	0.765				
	7	74	0.303	21	0.255				
	8	74	0.595	18	0.368				
	9	74	5.352	22	7.079				
	10	74	1.212	20	0.538				
	11	74	5.069	10	20.615				
	12	74	2.560	15	1.812				
	1	75	1.991	26	1.076				
	2	75	4.672	16	1.076				
	3	75	6.711	9	1.076	23	7.561		
	4	75	1.846	5	1.812	13	1.416		
	5	75	5.522						
0514E1	6	74	7.391	23	0.110				
	7	74	0.651	21	0.028				
	8	74	0.912	18	0.040				
	9	74	1.855	22	2.437				
	10	74	0.241	20	0.068				
	11	74	6.768	10	10.194				
	12	74	2.577	15	5.663				
	1	75	1.818	26	0.850				
	2	75	5.012	16	0.850				
	3	75	7.391	9	1.133	23	2.549		
	4	75	2.214	13	7.079	27	3.483		
	5	75	3.511						

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0514 OUACHITA LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0514F1	6	74	11.780	23	0.227				
	7	74	1.036	21	0.042				
	8	74	1.453	18	0.068				
	9	74	2.945	22	1.189				
	10	74	0.382	20	0.096				
	11	74	10.789						
	12	74	4.106	14	1.699				
	1	75	2.888	26	1.133				
	2	75	7.985	16	1.133				
	3	75	11.751	9	1.133	23	2.832		
	4	75	3.285	5	11.129	13	11.270	27	5.550
	5	75	5.578	4	6.824				
0514G1	6	74	9.741	23	0.227				
	7	74	0.855	21	0.040				
	8	74	1.201	18	0.227				
	9	74	2.444	22	1.274				
	10	74	0.317	20	0.099				
	11	74	8.920	10	2.549				
	12	74	3.398	14	1.416				
	1	75	2.393	26	0.991				
	2	75	6.626	16	1.133				
	3	75	9.741	23	2.832				
	4	75	2.716	13	9.345	27	4.587		
	5	75	4.616	4	5.635				
0514ZZ	6	74	69.093	23	8.778				
	7	74	6.688	28	0.283	21	0.283		
	8	74	8.523	18	2.832				
	9	74	17.358	22	43.891				
	10	74	2.248	20	3.681				
	11	74	63.430	10	121.762				
	12	74	24.069	15	65.129	15	65.129		
	1	75	16.990	26	12.743				
	2	75	47.006	15	8.495	16	8.495		
	3	75	69.093	9	25.485	23	19.822		
	4	75	19.284	5	65.412	13	66.261	27	32.593
	5	75	32.848	4	39.977				

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0510 HAMILTON LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 3732.2

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
0510A1	3732.2	89.08	119.84	117.80	114.88	107.49	31.21	17.67	10.31	16.74	16.20	47.18	66.26	62.53
0510A2	2861.9	52.10	48.87	35.08	45.05	56.38	45.05	37.75	47.84	46.16	46.78	34.57	46.27	45.16
0510E1	115.0	3.31	4.45	4.36	4.25	3.99	1.16	0.65	0.38	0.62	0.60	1.75	2.46	2.32
0510F1	204.9	5.92	7.96	7.82	7.62	7.14	2.07	1.17	0.69	1.11	1.08	3.14	4.39	4.15
0510G1	61.6	1.76	2.36	2.32	2.27	2.12	0.61	0.35	0.20	0.33	0.32	0.93	1.31	1.23
0510H1	88.6	2.53	3.40	3.34	3.26	3.06	0.87	0.50	0.29	0.48	0.46	1.34	1.88	1.78
0510J1	52.3	1.49	2.00	1.97	1.92	1.80	0.52	0.29	0.17	0.28	0.27	0.79	1.11	1.04
0510ZZ	347.8	10.08	13.56	13.34	13.00	12.18	3.54	2.00	1.17	1.89	1.83	5.35	7.50	7.08

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 3732.2
SUM OF SUB-DRAINAGE AREAS = 3732.2

TOTAL FLOW IN = 754.37
TOTAL FLOW OUT = 754.64

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0510A1	6	74	224.581	22	270.992				
	7	74	58.446	28	41.343				
	8	74	11.836	17	7.929				
	9	74	50.484	22	37.661				
	10	74	52.048	19	69.659				
	11	74	166.984	9	36.246				
	12	74	160.443	15	195.386				
	1	75	88.058	25	93.446				
	2	75	145.492						
	3	75	136.402	9	71.925	23	90.614		
	4	75	144.612	4	184.860	13	192.555	27	105.622
	5	75	142.151	3	100.242				
0510A2	6	74	176.131	22	267.311				
	7	74	58.333	28	39.927				
	8	74	11.355	17	8.948				
	9	74	44.741	22	0.566				
	10	74	50.687	19	94.012				
	11	74	95.711	9	28.883				
	12	74	127.143	14	185.759				
	1	75	64.138	25	87.782				
	2	75	90.897						
	3	75	89.170	9	66.403	23	53.616		
	4	75	120.406	13	185.051	27	93.729		
	5	75	89.198	2	0.566	3	0.566		

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0510 HAMILTON LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0510E1	6	74	6.460	22	0.538				
	7	74	0.210	20	0.198				
	8	74	0.289	17	0.396				
	9	74	0.815	22	4.248				
	10	74	0.246	19	0.566				
	11	74	0.382	9	0.991				
	12	74	3.964	14	2.662				
	1	75	3.143	25	0.906				
	2	75	7.362	15	1.472				
	3	75	7.730	9	1.104	23	3.596		
	4	75	2.895	13	1.586	27	1.557		
	5	75	6.654	3	11.327				
0510F1	6	74	11.383	22	0.850				
	7	74	0.374	20	0.311				
	8	74	0.513	17	0.623				
	9	74	1.453	22	5.212				
	10	74	0.439	19	0.850				
	11	74	14.951	9	1.529				
	12	74	7.051	14	4.729				
	1	75	5.578	25	1.586				
	2	75	13.111	15	2.633				
	3	75	13.762	9	1.954	23	6.400		
	4	75	3.736	27	2.803				
	5	75	11.865	3	16.990				
0510G1	6	74	3.426	22	0.212				
	7	74	0.113	20	0.051				
	8	74	0.156	17	0.127				
	9	74	0.436	22	3.964				
	10	74	0.133	19	0.212				
	11	74	4.502	9	0.481				
	12	74	2.118	14	1.416				
	1	75	1.682	25	0.481				
	2	75	3.936	15	0.793				
	3	75	4.134	9	0.595	23	1.926		
	4	75	1.127	27	0.850				
	5	75	3.568	3	5.663				
0510H1	6	74	4.927	22	0.311				
	7	74	0.161	20	0.096				
	8	74	0.221	17	0.215				
	9	74	0.629	22	3.390				
	10	74	0.198	18	0.311				
	11	74	0.456	9	0.595				
	12	74	3.838	14	2.039				
	1	75	2.415	25	0.680				
	2	75	5.663	15	1.133				
	3	75	5.947	9	0.850	23	2.775		
	4	75	1.620	13	1.218	27	1.218		
	5	75	5.125	3	8.495				

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0510 HAMILTON LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0510J1	6	74	2.917	22	0.198				
	7	74	0.096	20	0.048				
	8	74	0.130	17	0.127				
	9	74	0.371	22	3.398				
	10	74	0.113	18	0.198				
	11	74	3.823	9	0.425				
	12	74	1.798	14	1.218				
	1	75	1.427	25	0.396				
	2	75	3.341	15	0.680				
	3	75	3.511	9	0.510	23	1.642		
	4	75	0.957	13	0.708	27	0.708		
	5	75	3.030	3	5.663				
0510Z2	6	74	19.312	22	1.444				
	7	74	0.634	20	0.538				
	8	74	0.872	17	1.048				
	9	74	2.466	22	13.932				
	10	74	0.748	18	1.416	19	1.444		
	11	74	25.400	9	2.605				
	12	74	11.950	14	8.014	15	7.929		
	1	75	9.486	25	2.718				
	2	75	22.257	15	4.474				
	3	75	22.795	9	3.313	23	10.845		
	4	75	6.371	13	4.757	27	4.814		
	5	75	20.133	2	33.980	3	33.980		

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0505 CATHERINE LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 3926.4

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
0505A1	3926.4	79.06	90.95	72.07	89.68	94.55	47.26	41.06	44.94	48.05	48.82	60.06	75.18	65.82
0505A2	3732.2	89.08	119.84	117.80	114.68	107.49	31.21	17.67	10.31	16.74	16.20	47.18	66.26	62.53
0505C1	129.5	3.00	4.02	3.96	3.85	3.60	1.05	0.59	0.35	0.56	0.54	1.58	2.22	2.10
0505D1	32.1	0.731	0.983	0.966	0.943	0.881	0.255	0.144	0.085	0.136	0.133	0.388	0.544	0.513
0505ZZ	32.6	0.742	0.997	0.980	0.957	0.895	0.261	0.147	0.085	0.139	0.136	0.394	0.552	0.521

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 3926.4
SUM OF SUB-DRAINAGE AREAS = 3926.4

TOTAL FLOW IN = 792.44
TOTAL FLOW OUT = 791.68

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0505A1	6	74	272.691	22	271.842				
	7	74	59.182	22	8.297				
	8	74	12.629	17	8.552				
	9	74	56.351	21	42.758				
	10	74	53.519	19	70.509				
	11	74	173.016	24	360.473				
	12	74	167.353	22	9.656				
	1	75	90.331	19	9.345				
	2	75	146.964	22	130.257				
	3	75	144.982	7	70.226	23	99.392		
	4	75	146.398	5	212.376	19	70.792		
	5	75	144.274	17	98.259				
0505A2	6	74	224.581	22	270.992				
	7	74	58.446	22	8.127				
	8	74	11.836	17	7.929				
	9	74	50.404	21	31.149				
	10	74	52.045	19	69.659				
	11	74	166.984	24	317.149				
	12	74	160.443	22	8.410				
	1	75	88.858	19	8.099				
	2	75	145.492	22	127.992				
	3	75	136.402	7	69.093	23	90.614		
	4	75	144.812	5	201.899	19	69.659		
	5	75	142.151	17	89.481				

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0505 CATHERINE LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0505C1	6	74	5.069	22	0.283				
	7	74	0.246	22	0.051				
	8	74	0.490	17	0.198				
	9	74	4.163	21	3.964				
	10	74	0.943	19	0.283				
	11	74	3.964	24	11.893				
	12	74	2.002	22	0.425				
	1	75	1.549	19	0.425				
	2	75	3.653	22	4.248				
	3	75	5.239	7	0.425	23	3.256		
	4	75	1.436	5	7.079	19	0.425		
	5	75	1.416	17	5.380				
0505D1	6	74	1.274	22	0.184				
	7	74	0.059	22	0.062				
	8	74	0.122	17	0.153				
	9	74	1.034	21	0.991				
	10	74	0.235	19	0.187				
	11	74	0.983	24	2.832				
	12	74	0.496	22	0.085				
	1	75	0.385	19	0.142				
	2	75	0.909	22	0.566				
	3	75	1.303	7	0.184	23	0.850		
	4	75	0.357	5	1.699	19	0.184		
	5	75	0.351	17	1.855				
0505Z2	6	74	1.274	22	0.184				
	7	74	0.062	22	0.062				
	8	74	0.125	17	0.153				
	9	74	1.051	21	0.991				
	10	74	0.238	19	0.187				
	11	74	1.000	24	2.832				
	12	74	0.504	22	0.085				
	1	75	0.391	19	0.142				
	2	75	0.923	22	0.566				
	3	75	1.322	7	0.187	23	0.850		
	4	75	0.362	5	1.699	19	0.187		
	5	75	0.357	17	1.869				

APPENDIX C

PHYSICAL AND CHEMICAL DATA

STORET RETRIEVAL DATE 77/02/02

051401
34 34 26.0 093 11 -5.0 3
LAKE OUACHITA
05051 ARKANSAS
101791

/TYPE/AMOUNT/LAKE

11EPALES 04001002
0145 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/25	14	45 0000	12.2		170	42	7.30	17	0.030	0.200	0.120	0.015
	14	45 0010	12.1	10.0		40	7.20	16	0.020	0.200K	0.120	0.013
	14	45 0030	10.1	10.0		39	7.00	16	0.020	0.200K	0.130	0.012
	14	45 0060	8.8	9.4		36	6.80	19	0.020	0.200K	0.130	0.013
	14	45 0100	8.2	7.0		48	6.60	22	0.020	0.200	0.160	0.006
	14	45 0140	7.6	6.0		43	6.50	20	0.020	0.200K	0.170	0.012
74/06/06	13	30 0000	24.1		150	90	7.30	26	0.040	0.600	0.030	0.010
	13	30 0005	23.9	8.4		90	7.90	25	0.040	0.200	0.020	0.009
	13	30 0015	22.9	7.8		86	7.80	25	0.050	0.200	0.030	0.008
	13	30 0030	19.1	7.4		76	6.80	26	0.060	0.200	0.110	0.004
	13	30 0045	15.1	7.8		71	6.90	26	0.030	0.200	0.140	0.007
	13	30 0080	9.4	7.8		69	7.00	27	0.030	0.200	0.180	0.008
	13	30 0141	8.2	5.2		71	6.70	29	0.020	0.200K	0.190	0.007
74/10/17	09	25 0000	20.9	6.6	160	64	7.00	26	0.040	0.500	0.020K	0.004
	09	25 0005	20.9	6.8		62	7.00	25	0.020	0.300	0.020K	0.004
	09	25 0025	20.9	7.2		61	7.00	25	0.020	0.300	0.020K	0.004
	09	25 0056	20.7	6.2		59	6.90	24	0.030	0.200	0.020K	0.004
	09	25 0070	14.0	2.4		57	6.60	24	0.020K	0.200K	0.170	0.004
	09	25 0085	10.6	3.2		53	6.50	23	0.040	0.200K	0.240	0.003
	09	25 0100	9.5	3.2		55	6.50	23	0.020K	0.200K	0.240	0.003
	09	25 0115	9.1	2.6		56	6.50	23	0.020K	0.200	0.240	0.003
	09	25 0130	9.0	2.4		58	6.50	23	0.020	0.200K	0.230	0.007

K VALUE KNOWN TO BE
LESS THAN INDICATED

50A

C51401
34 34 26.0 093 11 45.0 3
LAKE QUACHITA
05051 ARKANSAS

101791

/TYPA/AMONT/LAKE

11EPALES 04001002
0145 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/25	14 45	0000	0.014	0.4	
	14 45	0010	0.012		
	14 45	0030	0.009		
	14 45	0060	0.009		
	14 45	0100	0.007		
	14 45	0140	0.012		
74/06/06	13 30	0000	0.061	3.7	
	13 30	0005	0.016		
	13 30	0015	0.014		
	13 30	0030	0.012		
	13 30	0045	0.010		
	13 30	0080	0.008		
	13 30	0141	0.010		
74/10/17	09 25	0000	0.017	2.6	
	09 25	0002			50.0
	09 25	0005	0.014		
	09 25	0014			5.0
	09 25	0025	0.014		1.0
	09 25	0056	0.014		
	09 25	0070	0.012		
	09 25	0085	0.011		
	09 25	0100	0.011		
	09 25	0115	0.012		
	09 25	0130	0.019		

51 A

STORET RETRIEVAL DATE 77/02/02

051402
34 36 18.0 093 14 52.0 3
LAKE OUACHITA
05051 ARKANSAS

1017+1

/TYPA/AMBNT/LAKE

11EPALES 04001002
0104 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/25	15 35	0000	12.0		150	38	7.20	16	0.020	0.200	0.130	0.013
	15 35	0010	12.0	10.0		38	7.20	17	0.020	0.200	0.130	0.005
	15 35	0025	11.5	10.2		40	7.20	19	0.020	0.200	0.130	0.013
	15 35	0060	8.8	9.6		37	6.90	23	0.020	0.200K	0.150	0.014
	15 35	0100	8.2	6.8		40	6.60	28	0.030	0.200	0.160	0.013
74/06/06	13 50	0000	24.3		140	90	7.60	26	0.040	0.300	0.060	0.012
	13 50	0005	24.3	7.6		82	7.70	27	0.030	0.200	0.040	0.009
	13 50	0025	23.8	7.4		77	7.00	28	0.040	0.200	0.040	0.010
	13 50	0050	14.3	7.2		68	6.70	24	0.060	0.200	0.240	0.010
	13 50	0080						26	0.040	0.200K	0.180	0.012
	13 50	0086	9.7	6.8		64	6.40					
	13 50	0116	8.7			75	6.50	26	0.030	0.200K	0.210	0.009
74/10/17	10 30	0000	20.8	7.2	168	61	7.05	23	0.020	0.300	0.020	0.002K
	10 30	0005	20.8	7.2		61	7.00	22	0.020	0.200K	0.020K	0.005
	10 30	0030	20.8	7.2		60	7.00	23	0.040	0.200K	0.020K	0.004
	10 30	0054	20.6	2.8		57	6.80	23	0.040	0.200K	0.020K	0.005
	10 30	0080	12.2	2.0		53	6.50	25	0.020	0.200K	0.220	0.004
	10 30	0105	9.6	1.8		56	6.40	23	0.020K	0.200K	0.260	0.003
	10 30	0120	9.3	1.4		57	6.40	21	0.040	0.400	0.280	0.007
	10 30	0137	9.2	0.8		86	6.60	42	0.550	0.600	0.088	0.004

K VALUE KNOWN TO BE
LESS THAN INDICATED

051402
34 36 18.0 093 14 52.0 3
LAKE OUAC ITA
05051 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0108 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMAING PERCENT
74/03/25	15 35	0000	0.010	0.8	
	15 35	0010	0.008		
	15 35	0025	0.009		
	15 35	0060	0.009		
	15 35	0100	0.010		
74/06/06	13 50	0000	0.013	3.4	
	13 50	0005	0.011		
	13 50	0025	0.012		
	13 50	0050	0.008		
	13 50	0080	0.014		
	13 50	0116	0.008		
74/10/17	10 30	0000	0.012	3.2	
	10 30	0005	0.012		50.0
	10 30	0017			5.0
	10 30	0030	0.014		1.0
	10 30	0054	0.014		
	10 30	0080	0.009		
	10 30	0105	0.008		
	10 30	0120	0.069		
	10 30	0137	0.039		

5345

STORET RETRIEVAL DATE 77/02/02

051403
34 34 57.0 093 20 03.0 3
LAKE OUACHITA
05051 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0130 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRNSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/26	15 40	0000	11.7		110	40	7.10	14	0.030	0.300	0.140	0.013
	15 40	0010	11.7	10.0		40	7.10	14	0.030	0.200	0.130	0.014
	15 40	0020	11.6	10.0		40	7.00	13	0.030	0.300	0.130	0.016
	15 40	0040	11.3	10.0		40	7.00	11	0.030	0.200	0.130	0.015
	15 40	0080	8.4	8.6		36	6.55	10K	0.020	0.200	0.190	0.017
	15 40	0125	7.5	8.6		36	6.40	10K	0.020	0.200	0.220	0.017
74/06/06	15 15	0000	23.8		108	90	6.50	22	0.040	0.800	0.060	0.011
	15 15	0005	23.7	7.4		88	6.80	21	0.030	0.200K	0.040	0.002
	15 15	0020	23.4	6.4		85	6.70	21	0.030	0.200K	0.050	0.002K
	15 15	0040	15.6	5.6		78	6.60	21	0.020	0.200K	0.140	0.002
	15 15	0075	10.2	5.4		70	6.30	22	0.040	0.200K	0.280	0.003
	15 15	0111	9.1	4.0		75	6.20	21	0.030	0.200K	0.290	0.003
74/10/18	09 10	0000	20.8	7.6	120	64	7.30	24	0.030	0.200	0.060	0.005
	09 10	0005	20.8	7.4		64	7.25	23	0.030	0.200K	0.030	0.003
	09 10	0020	20.8	7.6		64	7.20	23	0.020	0.200K	0.020	0.002
	09 10	0053	20.5	6.8		64	7.20	21	0.040	0.200K	0.020K	0.002
	09 10	0070	14.4	1.8		64	6.70	26	0.060	0.200K	0.050	0.002K
	09 10	0085	11.6	0.0		69	6.70	26	0.190	0.200	0.020K	0.006
	09 10	0100	10.4	0.6		72	6.70	30	0.260	0.400	0.020K	0.009

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

091403
34 34 57.0 093 20 03.0 3
LAKE OUACHITA
05051 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0130 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCOT LT REMNING PERCENT
74/03/26	15 40	0000	0.01M	1.6	
	15 40	0010	0.014		
	15 40	0020	0.018		
	15 40	0040	0.014		
	15 40	0080	0.015		
	15 40	0125	0.018		
74/06/06	15 15	0000	0.021	3.0	
	15 15	0005	0.011		
	15 15	0020	0.009		
	15 15	0040	0.007		
	15 15	0075	0.009		
	15 15	0111	0.009		
74/10/18	09 10	0000	0.014	7.9	
	09 10	0002			50.0
	09 10	0005	0.013		
	09 10	0010			5.0
	09 10	0019			1.0
	09 10	0020	0.012		
	09 10	0053	0.011		
	09 10	0070	0.012		
	09 10	0085	0.016		
	09 10	0100	0.032		

STORET RETRIEVAL DATE 77/02/02

051404
34 34 22.0 093 27 45.0 3
LAKE OUACHITA
05097 ARKANSAS

101791

/TYPA/AMONT/LAKE

11EPALES 04001002
0057 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	09 50	0000	12.7		108	140	7.30	32	0.040	0.500	0.100	0.015
	09 50	0005	12.3	10.0		130	7.05	34	0.030	0.200	0.080	0.014
	09 50	0030	11.5	9.6		140	7.00	33	0.030	0.200K	0.090	0.014
	09 50	0050	9.9	7.6		160	6.60	37	0.030	0.200K	0.140	0.014
74/06/07	14 10	0000	24.2		5	119	6.70	40	0.050	0.400	0.060	0.006
	14 10	0005	24.1	6.4		119	6.80	33	0.050	0.200	0.040	0.004
	14 10	0015	24.0	6.2		119	6.70	36	0.050	0.200	0.040	0.005
	14 10	0025	23.7	4.8		125	6.90	37	0.070	0.200	0.140	0.005
	14 10	0046	16.7	2.8		113	6.50	35	0.080	0.300	0.150	0.006
74/10/14	11 10	0000	20.0	7.2	96	72	7.40	28	0.040	0.200K	0.020K	0.002
	11 10	0005	20.7	7.0		69	7.15	26	0.050	0.200K	0.020K	0.002
	11 10	0025	20.6	6.2		68	7.01	23	0.060	0.200K	0.030	0.002
	11 10	0047	20.3	6.0		71	6.95	23	0.100	0.200	0.020K	0.003
	11 10	0059	17.5	0.0		88	6.75	30	0.400	0.600	0.020K	0.005
	11 10	0069	14.5	0.0		103	6.80	40	0.920	1.100	0.020K	0.016

K VALUE KNOWN TO BE
LESS THAN INDICATED

051404
34 34 22.0 093 27 45.0 3
LAKE QUAC .TA
05097 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0057 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	09 50	0000	0.016	4.3	
	09 50	0005	0.016		
	09 50	0030	0.015		
	09 50	0050	0.016		
74/06/07	14 10	0000	0.020	4.4	
	14 10	0005	0.018		
	14 10	0015	0.019		
	14 10	0025	0.023		
	14 10	0046	0.024		
74/10/18	11 10	0000	0.017	9.5	
	11 10	0003			50.0
	11 10	0005	0.016		
	11 10	0014			5.0
	11 10	0022			1.0
	11 10	0025	0.015		
	11 10	0047	0.016		
	11 10	0059	0.020		
	11 10	0069	0.075		

STORET RETRIEVAL DATE 77/02/02

051405
34 37 35.0 093 26 34.0 3
LAKE QUAC[illegible]TA
05097 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0030 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	10	30 0000	12.9		42	90	6.90	17	0.030	0.400	0.100	0.017
	10	30 0005	12.5	9.6		80	6.50	10	0.040	0.280	0.120	0.015
	10	30 0030	11.5	9.2		85	6.30	10K	0.040	0.200K	0.120	0.014
	10	30 0070	8.0	5.6		90	6.00	10K	0.080	0.200K	0.240	0.015
74/06/07	13	40 0000	24.4		64	88	6.50	18	0.050	0.300	0.070	0.004
	13	40 0005	24.4	6.0		87	6.60	17	0.050	0.300	0.040	0.004
	13	40 0015	24.2	3.8		85	6.20	18	0.090	0.300	0.140	0.007
	13	40 0025	20.1	1.2		81	6.10	18	0.080	0.300	0.150	0.007
	13	40 0050	15.6	0.6		78	6.00	15	0.050	0.200	0.250	0.010
	13	40 0071	10.8	2.0		85	6.10	20	0.110	0.200	0.130	0.006
74/10/18	10	35 0000	20.8	7.0	114	59	7.15	18	0.040	0.200	0.020	0.002K
	10	35 0005	20.7	6.6		57	7.00	18	0.040	0.200K	0.020	0.002
	10	35 0025	20.6	6.3		57	6.95	18	0.060	0.200K	0.020	0.003
	10	35 0040	20.5			56		19	0.100	0.200K	0.040	0.006
	10	35 0053	19.8	0.2		57	6.60	18	0.350	0.400	0.050	0.006
	10	35 0065	15.1	0.0		81	6.65	23	0.860	1.000	0.020K	0.043
	10	35 0072	13.8	0.0		93	6.70	31	1.370	1.300	0.020K	0.057

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

051405
34 37 35.0 093 26 34.0 3
LAKE OUACHITA
05047 ARKANSAS

1017+1

/TYPA/AMONT/LAKE

11EPALES 04001002
0080 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	10 30	0000	0.036	1.6	
	10 30	0005	0.042		
	10 30	0030	0.018		
	10 30	0070	0.025		
74/06/07	13 40	0000	0.023	3.5	
	13 40	0005	0.019		
	13 40	0015	0.022		
	13 40	0025	0.027		
	13 40	0050	0.028		
	13 40	0071	0.010		
74/10/18	10 35	0000	0.020	7.8	
	10 35	0003			50.0
	10 35	0005	0.019		
	10 35	0014			5.0
	10 35	0024			1.0
	10 35	0025	0.018		
	10 35	0040	0.020		
	10 35	0053	0.043		
	10 35	0065	0.098		
	10 35	0072	0.142		

59-01

STORET RETRIEVAL DATE 77/02/02

051406
34 37 17.0 093 23 12.0 3
LAKE OUACHITA
05031 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0075 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	10 55	0000	11.8		84	110	6.90	10K	0.040	0.200	0.140	0.016
	10 55	0005	11.5	10.0		110	7.00	10K	0.030	0.200K	0.130	0.013
	10 55	0030	11.2	9.6		100	6.80	10K	0.030	0.200K	0.130	0.013
	10 55	0065	8.1	7.6		100	6.30	10K	0.040	0.300	0.240	0.015
74/06/07	13 00	0000	24.1		84	94	6.70	21	0.040	0.300	0.080	0.004
	13 00	0005	24.1	7.4		93	6.90	20	0.040	0.200K	0.060	0.002
	13 00	0015	24.1	7.0		93	6.70	21	0.030	0.200K	0.040	0.003
	13 00	0030	23.9	6.8		91	6.80	21	0.040	0.200	0.040	0.005
	13 00	0045	15.8	4.2		81	6.45	20	0.030	0.200K	0.140	0.002
	13 00	0071	11.4	3.0		79	6.30	19	0.030	0.200K	0.240	0.002
74/10/18	09 50	0000	20.8	7.0	114	61	7.10	20	0.050	0.300	0.020K	0.002
	09 50	0005	20.8	6.8		60	7.05	19	0.040	0.200K	0.020K	0.002
	09 50	0020	20.8	7.0		60	6.90	21	0.070	0.200K	0.020	0.006
	09 50	0046	20.5	2.8		60	6.70	19	0.120	0.200K	0.030	0.003
	09 50	0055	18.9	0.0		62	6.60	19	0.180	0.300	0.020K	0.002
	09 50	0065	15.4	0.0		67	6.60	21	0.410	0.500	0.020K	0.003

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 11/02/92

051406
34 37 17.0 093 23 12.0 3
LAKE OUACHITA
05051 ARKANSAS

101791

/TYPE/AMBNT/LAKE

11EPALES 04001002
0075 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	10 55	0000	0.016	4.8	
	10 55	0005	0.015		
	10 55	0030	0.017		
	10 55	0065	0.016		
74/06/07	13 00	0000	0.012	3.4	
	13 00	0005	0.010		
	13 00	0015	0.015		
	13 00	0030	0.012		
	13 00	0045	0.009		
	13 00	0071	0.018		
74/10/18	09 50	0000	0.016	12.3	
	09 50	0002			50.0
	09 50	0005	0.012		
	09 50	0010			5.0
	09 50	0018			1.0
	09 50	0020	0.015		
	09 50	0046	0.015		
	09 50	0055	0.018		
	09 50	0065	0.019		

STORET RETRIEVAL DATE 77/02/02

051001
34 29 05.0 093 07 51.0 3
LAKE HAMILTON
05051 AR ARKANSAS

101791

/TYPA/AMHNT/LAKE

11EPALES 04001002
0043 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	14	35 0000	13.2		84	120	7.15	12	0.040	0.400	0.080	0.016
	14	35 0005	12.9	9.8		140	7.00	10K	0.040	0.300	0.080	0.014
	14	35 0020	11.6	9.8		140	6.70	10K	0.040	0.200	0.090	0.015
	14	35 0035	9.9	10.0		140	6.70	15	0.030	0.200K	0.120	0.012
74/06/05	13	10 0000	24.9		42	51	6.90	20	0.060	0.300	0.090	0.005
	13	10 0005	24.9	7.4		51	6.85	13	0.040	0.200	0.050	0.003
	13	10 0010	23.9	7.2		51	6.70	15	0.050	0.200	0.070	0.004
	13	10 0020	22.5	6.4		50	6.60	15	0.040	0.200K	0.070	0.004
	13	10 0030	20.3	6.6		52	6.50	18	0.040	0.200K	0.080	0.003
	13	10 0040	16.3	6.6		50	6.70	21	0.050	0.200K	0.120	0.002
74/10/15	16	00 0000	20.3	9.0	78	35	7.40	16	0.020	0.300	0.020K	0.002
	16	00 0005	20.2	8.4		35	7.45	19	0.020	0.300	0.010	0.003
	16	00 0016	18.8	6.4		32	7.10	30	0.030	0.200K	0.060	0.006
	16	00 0021	18.5	6.0		31	7.00	28	0.020	0.200K	0.060	0.003
	16	00 0035	17.0	5.4		29	6.90	28	0.020	0.200K	0.090	0.002
	16	00 0040	17.0	5.2		29	6.80	28	0.020	0.200	0.090	0.002

624

K VALUE KNOWN TO BE
LESS THAN INDICATED

051001
34 29 05.0 093 07 51.0 3
LAKE HAMILTON
05051 ARKANSAS
101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0043 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	14 35	0000	0.018	3.3	
	14 35	0005	0.020		
	14 35	0020	0.016		
	14 35	0035	0.013		
74/06/05	13 10	0000	0.049	8.0	
	13 10	0005	0.044		
	13 10	0010	0.040		
	13 10	0020	0.046		
	13 10	0030	0.036		
	13 10	0040	0.027		
74/10/15	16 00	0000	0.025	6.6	
	16 00	0003			50.0
	16 00	0005	0.024		
	16 00	0011			5.0
	16 00	0016	0.019		1.0
	16 00	0021	0.016		
	16 00	0035	0.016		
	16 00	0040	0.016		

635

STORET RETRIEVAL DATE 77/02/02

051002
34 27 06.0 093 06 15.0 3
LAKE HAMILTON
05051 ARKANSAS

101791

/TYPA/AMONT/LAKE

11EPALES 04001002
0012 FEET DEPTH CLASS 30

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	15	00 0000	13.6		120	140	7.15	11	0.030	0.400	0.070	0.013
	15	00 0005	13.8	10.0		130	6.95	13	0.030	0.200	0.070	0.015
74/06/05	10	15 0000	25.6		60	53	7.00	20	0.080	0.600	0.100	0.011
	10	15 0005	25.6	7.6		53	6.50	20	0.050	0.400	0.070	0.006
	10	15 0012	24.1	4.0		53	6.80	20	0.090	0.400	0.170	0.007
74/10/15	15	30 0000	20.6	8.0	60	36	7.10	12	0.030	0.400	0.020K	0.005
	15	30 0005	20.0	7.0		35	7.05	13	0.030	0.300	0.020K	0.005
	15	30 0010	19.7	6.0		34	7.00	14	0.030	0.300	0.02[illegible]K	0.003

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	15	00 0000	0.016	5.1	
	15	00 0005	0.017		
74/06/05	10	15 0000	0.038	7.8	
	10	15 0005	0.051		
	10	15 0012	0.041		
74/10/15	15	30 0000	0.018	7.4	
	15	30 0002			50.0
	15	30 0005	0.018		
	15	30 0009			5.0
	15	30 0010	0.016		
	15	30 0014			2.0

K VALUE KNOWN TO BE
LESS THAN INDICATED

34 20 38.0 093 07 41.0 3
LAKE HAMILTON
05051 ARKANSAS

111791

/TYPA/AMONT/LAKE

11EPALES 04001002
0029 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	15 20	0000	13.7		60	120	6.85	14	0.030	0.200	0.090	0.014
	15 20	0005	12.6	9.4		125	6.70	16	0.040	0.300	0.090	0.012
	15 20	0025	12.0	10.8		120	6.50	13	0.060	0.200	0.100	0.015
74/06/05	12 20	0000	25.2		48	46	7.10	17	0.070	0.600	0.090	0.006
	12 20	0005	25.2	7.2		47	7.00	18	0.050	0.400	0.060	0.004
	12 20	0010	25.2	7.2		47	7.00	18	0.040	0.300	0.040	0.004
	12 20	0020	23.2	3.8		38	6.40	16	0.080	0.300	0.090	0.006
	12 20	0030	20.8	3.2		35	6.35	15	0.210	0.400	0.180	0.015
74/10/15	15 00	0000	20.0	[illegible]	72	34	7.10	11	0.020	0.400	0.020K	0.002
	15 00	0005	19.0	6.8		32	7.05	10K	0.020	0.300	0.020K	0.002
	15 00	0016	19.0	6.4		32	7.00	10	0.030	0.300	0.020K	0.002
	15 00	0035	18.0	1.2		35	6.70	15	0.190	0.400	0.020	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED

65 CPV

STORET RETRIEVAL DATE 77/02/02

051003
34 26 38.0 093 07 41.0 3
LAKE HAMILTON
05051 ARKANSAS
101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0029 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	04031 INCDT LT REMNING PERCENT
74/03/27	15	20 0000	0.019	3.7	
	15	20 0005	0.015		
	15	20 0025	0.025		
74/06/05	12	20 0000	0.047	14.3	
	12	20 0005	0.039		
	12	20 0010	0.047		
	12	20 0020	0.058		
	12	20 0030	0.073		
74/10/15	15	00 0000	0.018	7.9	
	15	00 0003			50.0
	15	00 0005	0.018		
	15	00 0010			5.0
	15	00 0016	0.019		1.0
	15	00 0035	0.021		

STORET RETRIEVAL DATE 77/02/02

051004
34 26 19.0 093 05 46.0 3
LAKE HAMILTON
05051 ARKANSAS

/TYPA/AMBNT/LAKE

101791

11EPALES 04001002
0049 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	15 40	0000	13.6									
	15 40	0005	13.1	10.2	46	150	7.30	15	0.040	0.400	0.080	0.016
	15 40	0020	12.4	9.4		150	7.30	16	0.040	0.200	0.080	0.015
	15 40	0045	10.9	9.8		140	6.70	16	0.040	0.200K	0.100	0.015
74/06/05	09 20	0000	25.1			140	6.80	19	0.030	0.200K	0.100	0.014
	09 20	0005	25.0	7.0	72	52	7.00	17	0.050	0.600	0.080	0.006
	09 20	0010	23.0	4.6		52	6.80	17	0.060	0.300	0.100	0.006
	09 20	0030	21.0	5.4		45	6.50	17	0.050	0.300	0.090	0.005
	09 20	0045	19.0	5.2		44	6.45	16	0.070	0.300	0.100	0.008
	09 20	0050	17.8	6.0		49	6.50	19	0.120	0.200	0.140	0.008
74/10/15	14 20	0000	20.2	8.0	96	49	6.60	22	0.110	0.300	0.150	0.007
	14 20	0005	20.2	7.6		38	7.25	15	0.020	0.600	0.020	0.004
	14 20	0025	19.9	8.0		38	7.30	14	0.020	0.400	0.020K	0.003
	14 20	0040	18.8	5.0		37	7.30	13	0.020	0.500	0.020K	0.004
	14 20	0055	17.4	4.6		34	6.90	15	0.040	0.500	0.040	0.005
						31	6.80	13	0.080	0.600	0.070	0.005

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

051004
34 26 19.0 093 05 46.0 3
LAKE HAMILTON
05051 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0040 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	15 40	0000	0.018	6.7	
	15 40	0005	0.017		
	15 40	0020	0.015		
	15 40	0045	0.013		
74/06/05	09 20	0000	0.034	6.9	
	09 20	0005	0.041		
	09 20	0010	0.035		
	09 20	0030	0.045		
	09 20	0045	0.027		
	09 20	0050	0.039		
74/10/15	14 20	0000	0.019	8.6	
	14 20	0004			50.0
	14 20	0005	0.017		
	14 20	0016			5.0
	14 20	0025	0.015		1.0
	14 20	0040	0.015		
	14 20	0055	0.024		

STORET RETRIEVAL DATE 77/02/02

051005
34 27 03.0 093 02 47.0 3
LAKE HAMILTON
05051 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0030 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	16	30 0000	14.1		40	180	9.20	24	0.040	0.800	0.050	0.017
	16	30 0005	13.9	12.6		175	8.80	24	0.030	0.600	0.090	0.016
	16	30 0025	12.5	9.2		240	7.00	27	0.380	0.700	0.320	0.047
74/06/04	15	35 0000	26.2		66	77	9.50	19	0.040	0.600	0.050	0.004
	15	35 0005	25.7	10.0		74	8.80	20	0.030	0.500	0.080	0.007
	15	35 0015	24.2	4.4			6.90	26	0.400	0.800	0.680	0.070
	15	35 0025	20.4	3.0			6.40	18	0.260	0.500	0.220	0.034
	15	35 0031	19.7	0.8			6.35	20	0.260	0.500	0.170	0.028
74/10/15	13	45 0000	20.9	9.0	60	125	7.45	25	0.560	1.200	0.590	0.027
	13	45 0005	20.7	7.4		118	7.45	25	0.620	1.200	0.650	0.032
	13	45 0013	20.4			85						
	13	45 0015	19.9	2.6		88	7.40	23	0.380	0.900	0.490	0.009
	13	45 0021	19.6			106						
	13	45 0030	18.7	0.6		50	6.70	20	0.240	0.700	0.250	0.018
	13	45 0040	18.1	0.6		39	6.70	18	0.240	0.700	0.120	0.009

69

STORET RETRIEVAL DATE 77/02/02

051005
34 27 03.0 093 02 47.0 3
LAKE HAMILTON
05051 ARKANSAS
101741

/TYPA/AMOUNT/LAKE

11EPALES 04001002
0040 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	16	30 0000	0.058	21.4	
	16	30 0005	0.043		
	16	30 0025	0.085		
74/06/04	15	35 0000	0.036	27.7	
	15	35 0005	0.048		
	15	35 0015	0.111		
	15	35 0025	0.064		
	15	35 0031	0.077		
74/10/15	13	45 0000	0.079	17.4	
	13	45 0002			50.0
	13	45 0005	0.081		
	13	45 0008			5.0
	13	45 0015	0.030		1.0
	13	45 0030	0.038		
	13	45 0040	0.090		

STORET RETRIEVAL DATE 77/02/02

051006
34 26 32.0 093 01 44.0 3
LAKE HAMILTON
05051 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0054 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	14 45	0000	13.2		72	160	8.50	20	0.040	0.400	0.070	0.016
	14 45	0005	13.2	11.6		150	8.20	18	0.040	0.400	0.060	0.016
	14 45	0025	12.4	8.8		150	6.60	15	0.060	0.200K	0.130	0.016
	14 45	0050	11.6	9.0		150	6.70	15	0.060	0.200K	0.140	0.013
74/06/04	14 50	0000	26.3		72	61	8.90	19	0.100	0.700	0.120	0.017
	14 50	0005	26.1	9.8		60	7.80	19	0.080	0.400	0.130	0.007
	14 50	0015	23.0	3.8		51	6.70	18	0.090	0.300	0.130	0.006
	14 50	0040	18.7	4.2		44	6.35	20	0.110	0.300	0.140	0.010
	14 50	0070	15.5	6.0		46	6.50	24	0.090	0.200	0.150	0.005
	14 50	0095	15.2	5.6		47	6.40	24	0.160	0.300	0.170	0.007
74/10/15	11 30	0000	20.7	9.2	96	45	8.00	15	0.020	0.400	0.020K	0.003
	11 30	0005	20.8	9.2		44	8.20	17	0.020K	0.400	0.020K	0.002
	11 30	0020	19.7	4.6		40	7.15	18	0.020K	0.300	0.060	0.002
	11 30	0025	19.3			47						
	11 30	0035	18.6	3.4		32	6.90	20	0.030	0.300	0.100	0.002
	11 30	0050	17.8	3.4		31	6.85	21	0.070	0.400	0.080	0.005
	11 30	0070	17.0	3.6		29	6.80	22	0.080	0.400	0.080	0.003
	11 30	0093	16.6	3.2		30	6.80	22	0.120	0.500	0.080	0.008

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

051006
34 26 32.0 093 01 44.0 3
LAKE HAMILTON
05051 ARKANSAS

101791

/TYPA/AMONT/LAKE

11EPALES 04001002
0054 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	14 45	0000	0.025	9.8	
	14 45	0005	0.025		
	14 45	0025	0.016		
	14 45	0050	0.014		
74/06/04	14 50	0000	0.035	21.7	
	14 50	0005	0.037		
	14 50	0015	0.024		
	14 50	0040	0.026		
	14 50	0070	0.016		
	14 50	0095	0.020		
74/10/15	11 30	0000	0.017	11.7	
	11 30	0005	0.014		50.0
	11 30	0017			5.0
	11 30	0020	0.014		
	11 30	0028			1.0
	11 30	0035	0.013		
	11 30	0050	0.013		
	11 30	0070	0.017		
	11 30	0093	0.022		

050501
34 25 38.0 092 58 22.0 3
LAKE CATHERINE
05051 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0020 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/26	15 35	0000	12.6		52	41	6.70	22	0.070	0.300	0.130	0.019
	15 35	0005	12.2	9.4		41	6.70	23	0.050	0.200	0.120	0.020
	15 35	0015	12.2	9.2		41	6.80	21	0.040	0.200	0.120	0.016
74/06/05	15 45	0000	17.9		36	48	6.50	17	0.110	0.300	0.170	0.012
	15 45	0005	17.8	5.2		49	6.40	16	0.100	0.200	0.160	0.011
	15 45	0015	17.8	5.6		48	6.60	14	0.070	0.200	0.220	0.019
74/10/15	11 00	0000	17.1	4.8	60	29	6.85	16	0.060	0.480	0.090	0.004
	11 00	0005	17.1	4.4		29	6.70	16	0.060	0.300	0.100	0.003
	11 00	0020	17.0	5.0		30	6.60	16	0.060	0.300	0.100	0.003

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/26	15 35	0000	0.027	4.7	
	15 35	0005	0.023		
	15 35	0015	0.020		
74/06/05	15 45	0000	0.022	1.9	
	15 45	0005	0.022		
	15 45	0015	0.095		
74/10/15	11 00	0000	0.015	2.0	
	11 00	0005	0.015		
	11 00	0020	0.014		

STORET RETRIEVAL DATE 77/02/02

050502
34 27 36.0 092 58 45.0 3
LAKE CATHERINE
05051 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0005 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/26	15 55	0000	11.6	13.0	42	41	8.20	20	0.030	0.400	0.050	0.014
74/06/05	15 15	0000	22.1		36	57	7.70	14	0.040	0.500	0.170	0.023
	15 15	0005	20.4	7.4		55	6.80	14	0.080	0.200	0.230	0.025
74/10/15	10 40	0000	18.1	6.4	36	39	7.00	18	0.030	0.400	0.040	0.005
	10 40	0005	18.1	6.4		39	6.95	17	0.020	1.200	0.040	0.004
	10 40	0010	18.0	6.4		39	6.80	17	0.040	0.500	0.040	0.005

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/26	15 55	0000	0.047	24.9	
74/06/05	15 15	0000	0.051	35.7	
	15 15	0005	0.060		
74/10/15	10 40	0000	0.034	17.0	
	10 40	0005	0.036		
	10 40	0010	0.040		

QUERY RETRIEVAL DATE 11/02/92

050503
34 27 07.0 092 54 20.0 3
LAKE CATHERINE
05059 ARKANSAS

101741

/TYPA/AMBNT/LAKE

11EPALES 04001002
0013 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/26	16 10	0000	14.5		60	99	7.55	19	1.540	1.800	0.170	0.017
	16 10	0005	13.8	10.6		97	7.20	16	1.420	1.600	0.160	0.015
	16 10	0010	13.6									
74/06/05	14 55	0000	21.6		42	45	7.30	15	0.140	0.300	0.130	0.003
	14 55	0005	21.1	8.2		42	6.65	14	0.080	0.200K	0.110	0.009
	14 55	0011	20.6	8.2		42	6.70	13	0.060	0.200K	0.090	0.006
74/10/15	10 10	0000	20.8	7.6	48	67	7.00	30	0.060	0.400	0.030	0.005
	10 10	0005	20.7	7.6		67	7.10	17	0.050	0.400	0.030	0.003
	10 10	0010	20.5	7.6		67	7.20	17	0.040	0.400	0.020	0.004

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCOT LT REMNING PERCENT
74/03/26	16 10	0000	0.027	11.7	
	16 10	0005	0.028		
74/06/05	14 55	0000	0.050	4.6	
	14 55	0005	0.041		
	14 55	0011	0.046		
74/10/15	10 10	0000	0.029	30.1	
	10 10	0005	0.025		
	10 10	0010	0.031		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

050504
34 25 35.0 092 53 50.0 3
LAKE CATHERINE
05059 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0047 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICRUMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/26	14 30	0000	15.6		72	131	6.90	16	2.260	2.400	0.180	0.020
	14 30	0006	14.4	9.8		140	7.00	14	1.770	2.000	0.180	0.018
	14 30	0010	13.0									
	14 30	0040	12.1	9.2		171	6.80	14	3.560	3.700	0.150	0.022
74/06/05	14 15	0000	23.4		36	134	6.60	17	1.700	1.600	0.250	0.011
	14 15	0005	22.8	6.8		114	6.60	17	1.230	1.200	0.230	0.006
	14 15	0015	21.4	6.6		97	6.50	17	0.930	1.000	0.200	0.004
	14 15	0035	19.5	5.6		144	6.50	17	1.790	1.900	0.190	0.011
	14 15	0050	19.2	5.4		192	7.20	16	0.040	0.300	0.040	0.003
74/10/15	09 10	0000	22.0	5.4	60	72	6.80	33	0.080	0.600	0.080	0.006
	09 10	0005	21.5	6.2		67	6.80	30	0.060	0.400	0.080	0.003
	09 10	0015	21.0	6.6		60	6.90	28	0.040	0.200	0.080	0.004
	09 10	0021	20.5	5.2		63	6.90	28	0.070	0.200K	0.080	0.003
	09 10	0027	19.1	5.2		78	6.80	30	0.080	0.200	0.080	0.003
	09 10	0042	18.6	4.4		66	6.80	30	0.100	0.200	0.090	0.005
	09 10	0055	18.3	3.2		64	6.65	30	0.140	0.300	0.090	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

050504
34 25 35.0 092 53 50.0 3
LAKE CATHERINE
05059 ARKANSAS

101791

/TYPA/AMBNT/LAKE

11EPALES 04001002
0047 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/26	14 30	0000	0.027	7.7	
	14 30	0006	0.030		
	14 30	0040	0.051		
74/06/05	14 15	0000	0.053	12.4	
	14 15	0005	0.051		
	14 15	0015	0.047		
	14 15	0035	0.056		
	14 15	0050	0.045		
74/10/15	09 10	0000	0.025	15.8	
	09 10	0005	0.019		5.0
	09 10	0009			1.0
	09 10	0015	0.019		
	09 10	0021	0.019		
	09 10	0027	0.018		
	09 10	0042	0.018		
	09 10	0055	0.030		

APPENDIX D

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051441
34 14 15 0 093 11 35.0
OUACHITA RIVER
05 7.5 MYN PINE
D/OUACHITA LAKE
BNK END OF LEVEE BELOW BLAKELY MT DAM PA
11EPALES 2111204
4 0000 FEET DEPTH

Reproduced from best available copy.

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	14 30		0.108	0.100K	0.010	0.005K	0.005K
74/07/20	14 25		0.140	0.100K	0.060	0.005	0.020
74/07/21	10 15		0.020	0.300	0.010	0.010	0.025
74/08/18	14 10		0.028	0.400	0.005	0.021	0.023
74/09/22	13 25		0.160	0.200	0.025	0.005K	0.005K
74/10/20	10 30		0.136	0.100K	0.015	0.005K	0.005K
74/11/10	10 35		0.112	0.300	0.016	0.008K	0.010K
74/12/14	10 00		0.104	0.800	0.085	0.005K	0.010
75/01/26	10 30		0.128	0.200	0.024	0.005K	0.010
75/02/16	10 10		0.136	0.100	0.032	0.005K	0.010K
75/03/09	11 30		0.128	0.200	0.008	0.008K	0.030
75/03/23	10 40		0.152	0.400	0.010	0.005K	0.010K
75/04/27	10 30		0.180	0.450	0.045	0.020	0.065
75/07/18	11 30		0.048	0.150	0.010	0.005K	0.040

K VALUE KNOWN TO BE LESS THAN INDICATED

NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051442
34 38 20.0 093 37 40.0
OUACHITA RIVER
05 15 MT IDA
T/OUACHITA LAKE
UNIMPROVED RD XING 1.5 MI S AR HWY 88 JC
ILEPALES 211204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	11 30		0.016	0.100	0.040	0.005K	0.045
74/08/18	10 25		0.008	0.300	0.005	0.024	0.024
74/10/20	10 50		0.032	0.100K	0.015	0.005K	0.010
74/11/10	10 30		0.032	1.600	0.272	0.024	
74/12/14	10 25		0.168	0.200	0.015	0.010	0.030
75/01/26	10 15		0.008	0.100	0.016	0.005K	0.020
75/02/15	10 20		0.136	0.450	0.032	0.008	0.010K
75/02/16	10 30		0.104	0.300	0.056	0.008K	0.020
75/03/09	10 20		0.008	0.100	0.012	0.008K	0.030
75/03/23	09 50		0.060	0.500	0.016	0.008	0.030
75/04/12	09 45		0.300	0.250	0.010	0.005K	0.010K
75/07/18	09 30		0.130	0.200	0.010	0.005K	0.003

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051431
34 31 57.0 093 22 20.0
WALNUT CREEK
05 07 CRYSTAL SPRN
T/OUACHITA LAKE
BNK NEAR MOUTH OF CREEK
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	13 25		0.012	0.100K	0.005K	0.010	0.015
74/07/21	11 45		0.032	0.200	0.005	0.020	0.030
74/08/18	12 15		0.032	0.100	0.005K	0.021	0.021
74/09/22	11 40		0.032	0.100K	0.020	0.015	0.015
74/10/20	12 15		0.024	0.100K	0.005K	0.025	0.025
74/11/10	10 40		0.016	0.600		0.016	
74/12/15	11 35		0.006	0.400	0.005	0.015	0.015
75/01/26	11 45		0.008	0.100K	0.016	0.015	0.020
75/02/16	11 40		0.032	0.600	0.032	0.016	0.060
75/03/09	11 30		0.008	0.100K	0.008K	0.016	0.040
75/03/23	11 30		0.012	0.100K	0.016	0.016	0.016
75/04/05	12 30		0.010	0.150	0.020	0.010	0.020
75/04/12	11 10			0.050K	0.010	0.005K	0.020
75/07/18	10 00		0.050	0.300	0.020	0.025	0.040

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

351421
34 31 58.0 093 31 15.0
TWIN CREEK
05 15 MT IDA
T/O JACHITE LAKE
US HWY 270 BRDG 1 MI W OF SILVER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	12 35		0.008	0.100K	0.010	0.005	0.010
74/07/21	11 20		0.012	0.100K	0.015	0.015	0.025
74/08/18	11 40		0.028	0.400	0.015	0.030	0.030
74/09/22	11 15		0.048	0.100K	0.025	0.010	0.010
74/10/20	12 45		0.016	0.100K	0.005K	0.020	0.020
74/11/10	11 10		0.016	1.000	0.048	0.016	
74/12/15	11 15		0.008	0.200	0.010	0.010	0.010
75/01/26	11 15		0.008	0.100K	0.016	0.010	0.010
75/02/16	11 20		0.016	0.100K	0.024	0.008	0.020
75/03/09	11 05		0.008	0.100K	0.008	0.016	0.030
75/03/23	10 10		0.008	0.300	0.008	0.008	0.010
75/04/05	11 45		0.010	1.600	0.030	0.010	0.010
75/04/13	10 45		0.165	0.300	0.005K	0.005K	0.020
75/04/27	11 30		0.005	0.250	0.025	0.010	0.010
75/07/18	13 00			0.250			0.020
	13 15		0.025	0.950K	0.010	0.020	0.030

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/26
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

351431
34 33 40.0 093 38 12.0
S FORK OUACHITA RIVER
05 15 NT TDA
T/OUACHITA LAKE
US HWY 270 BRDG AT N EDGE OF MOUNT IDA
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	12 10		0.016	0.100K	0.005	0.005K	0.010
74/07/21	11 50		0.004	0.300	0.015	0.005	0.025
74/08/18	11 25		0.024	0.300	0.010	0.007	0.020
74/09/22	10 45		0.024	0.200	0.020	0.005	0.050
74/10/20	11 30		0.024	0.100K	0.025	0.007	0.010
74/11/10	10 55		0.040	1.000	0.016	0.032	
74/12/15	11 30		0.032	0.400	0.010	0.005	0.010
75/01/26	10 45		0.016	1.500	0.032	0.005K	0.020
75/02/16	11 00		0.032	0.100	0.016	0.008K	0.010
75/03/09	10 55		0.008	0.100K	0.008	0.008K	0.030
75/03/23	10 25		0.024	0.200	0.012	0.008	0.010
75/04/05	11 30		0.025	0.500	0.010	0.010	0.020
75/04/13	10 00		0.055	0.050	0.005K	0.005K	0.010K
75/04/27	11 15		0.015	0.150	0.035	0.015	0.020
75/05/18	13 30		0.010	0.250	0.015	0.005K	0.020

53

— K VALUE KNOWN TO BE LESS THAN INDICATED —

[illegible] 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0514E1
34 39 45.0 093 30 35.0
MUDDY CREEK
05 15 MT IDA
T/OUACHITA LAKE
UNIMPROVED RD XING 1.8 MI E AR HWY 27 JC
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	10	55	0.016	0.100K	0.010	0.005K	0.015
74/07/21	09	50	0.008	0.200	0.020	0.010	0.030
74/08/19	10	00	0.016	0.500	0.005	0.015	0.035
74/10/20	10	20	0.024	0.100	0.015	0.005K	0.012
74/11/10	10	10	0.056	1.400	0.080	0.024	
74/12/15	10	00	0.048	0.100K	0.020	0.005	0.020
75/01/26	09	45	0.032	0.300	0.024	0.005K	0.020
75/02/16	10	00	0.048	0.200	0.040	0.008K	0.020
75/03/09	09	50	0.016	0.100	0.012	0.008K	0.040
75/03/23	09	30	0.028	1.100	0.024	0.008K	0.020
75/04/13			0.390	0.150	0.005K	0.005K	0.010K
75/04/27	09	45	0.005	0.450	0.022	0.005	0.010
75/07/18	11	00	0.010	0.675	0.010	0.005	0.037

— K VALUE KNOWN TO BE LESS THAN —
INDICATED

84

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0514F1
34 41 28.0 093 24 44.0
IRONS FORK
05 7.5 FANNIE
T/OUACHITA LAKE
AR HWY 298 2.3 MI E OF FANNIE
11EPALES 2111204
4 0000 FEET DEPTH

Reproduced from best available copy.

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	09 45		0.012	0.900	0.057	0.005K	0.017
74/07/21	10 20		0.028	0.300	0.025	0.005	0.025
74/08/18	10 00		0.008	0.300	0.010	0.010	0.010
74/10/20	10 10		0.024	0.100	0.005	0.005K	0.015
74/12/14	09 45		0.024	0.550	0.045	0.005	0.025
75/01/26	10 00		0.008	1.200	0.048	0.005K	0.020
75/02/16	09 25		0.008	0.600	0.032	0.000K	0.050
75/03/09	09 16		0.008	0.200	0.008	0.008K	0.040
75/03/23	09 51		0.009	0.100	0.013	0.008K	0.010
75/04/05	10 30		0.025	0.500	0.045	0.010	0.030
75/04/13	09 15		0.025	0.100	0.005K	0.005K	0.035
75/04/27	09 00		0.005	0.050K	0.010	0.005	0.020
75/05/04	09 30		0.020	0.250	0.010	0.005K	0.010

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 75/11/23
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

05140:
34 41 20.0 093 20 29.0
NORTH FORK
05 7.5 AVANT
T/OUACHITA LAKE
AR HWY 298 BROG 7.4 MI E OF FANNIE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	10	05	0.012	0.600	0.040	0.005K	0.010
74/07/21	10	35	0.008	0.400	0.020	0.005K	0.035
74/08/18	10	15	0.024	0.200	0.032	0.022	0.022
74/10/20	10	25	0.024	0.100	0.015	0.005K	0.005
74/12/14	10	30	0.016	0.700	0.055	0.005	0.020
75/01/26	10	35	0.008	0.300	0.016	0.005K	0.010
75/02/16	09	35	0.008	0.300	0.016	0.008K	0.020
75/03/23	10	07	0.012	0.500	0.024	0.008K	0.010
75/04/13	09	40	0.010	0.450	0.005K	0.005K	0.010K
75/04/27	09	15	0.005	0.100	0.010	0.005	0.020
75/05/04	09	45	0.035	0.100	0.010	0.005	0.020

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/23
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0514M1
34 40 27.0 093 19 34.0
DALEY CREEK
05 7.5 AVANT
T/OUACHITA LAKE
2NDRY RD BRDG 1.2 MI S AR HWY 298 JCT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	10 15		0.008	0.400	0.025	0.005	0.010
74/07/21	10 45		0.024	0.100K	0.010	0.010	0.020
74/08/18	10 30		0.008	0.100K	0.035	0.015	0.015
74/10/20	10 45		0.024	0.100K	0.005K	0.010	0.015
74/11/10	10 15		0.048	1.000	0.038	0.032	
74/12/14	10 20		0.008	0.400	0.015	0.005	0.010K
75/01/26	10 30		0.008	1.900	0.072	0.005	0.020
75/02/16	09 30		0.008	0.350	0.056	0.008K	0.020
75/03/09	10 25		0.008	0.200	0.008	0.008K	0.030
75/03/23	10 20		0.012	0.400	0.016	0.008	0.010K
75/04/13	09 51		0.010	0.350	0.015	0.005	0.020
75/04/27	09 45		0.005	1.800	0.120	0.010	0.020
75/05/04	10 00		0.035	0.250	0.015	0.010	0.010

K VALUE KNOWN TO BE LESS THAN INDICATED

NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0514J1
34 40 45.0 093 10 27.0
BIG BLAKELY CREEK
05 GARLAND COUNTY
T/OUACHITA LAKE
2NDRY RD BRDG 1.9 MI S JCT HWY 298 JCT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	10	55	0.012	0.100K	0.010	0.005K	0.005K
74/07/21	11	15	0.016	0.100	0.010	0.010	0.030
74/08/18	11	10	0.004	0.100	0.030	0.025	0.025
74/10/20	11	30	0.016	0.100K	0.005K	0.010	0.015
74/11/10	10	30	0.096	0.800	0.016	0.024	
74/12/14	11	10	0.024	0.500	0.020	0.005	0.010K
75/01/26	11	00	0.008	0.300	0.024	0.005	0.010
75/02/16	10	10	0.008	0.200	0.028	0.008K	0.010
75/03/09	10	40	0.012	0.100	0.008	0.008K	0.040
75/03/23	10	35	0.012	0.150	0.016	0.016	0.016
75/04/13	10	10	0.005	0.100	0.010	0.005	0.010K
75/04/27	10	15	0.005	0.100	0.015	0.010	0.020
75/05/04	10	20	0.035	0.250	0.030	0.005	0.010

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0514K1
34 40 07 0 093 09 00.0
LT BLAKELY CREEK
05 GARLAND COUNTY
T/O HACHITA LAKE
2NDRY RD BRDG 5 MI W AP HWY 7 JCT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/23	11	30	0.016	0.100K	0.010	0.010	0.020
74/07/21	12	10	0.016	0.100K	0.010	0.020	0.030
74/08/18	13	45	0.008	0.200	0.030	0.025	0.030
74/09/22	11	30	0.024	0.200	0.025	0.040	0.050
74/10/20	11	50	0.040	0.100K	0.005K	0.015	0.015
74/11/10	11	00	0.016	0.900	0.088	0.032	
74/12/14	11	15	0.024	0.300	0.072	0.005	0.010K
75/01/26	11	30	0.008	0.400	0.024	0.010	0.020
75/02/16	10	30	0.016	0.300	0.016	0.008K	0.010K
75/03/09	11	05	0.008	0.400	0.008	0.012	0.050
75/03/23	11	00	0.012	1.100	0.016	0.008	0.010K
75/04/04	10	55	0.010	0.100	0.005K	0.010	0.010
75/04/13	10	40	0.030	0.050	0.015	0.005	0.030
75/04/27	10	30	0.005	0.150	0.015	0.010	0.020
75/07/18	10	15	0.035		0.010	0.020	

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

J5140A PD05140A P000800
34 33 30 0 093 37 15.0
MT. IDA
35 15 MT. IDA
T/LAKE OUACHITA
S. FORK OUACHITA RIVER
11EPALES
4 2141204
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/02/10	11 30		0.080	1.000K	0.160	3.000	3.300	0.120	0.140
75/03/12	10 45		0.080	11.000	0.410	3.500	4.100	0.180	0.070
75/04/14	10 15		0.050	9.600	1.350	3.000	3.900	0.093	0.143
75/04/25	10 15		0.050	10.500	1.350	3.150	3.800	0.108	0.143
75/05/05	10 00		0.100	11.500	1.500	3.300	4.200	0.354	0.180
75/05/30	10 00		0.150	3.900	0.410	1.400	1.600	0.307	0.199
75/06/06	09 30		0.050	1.600	0.140	0.920	1.200	0.078	0.180
75/06/24	10 00		0.050	3.200	0.280	0.666	1.070	0.064	0.180
75/07/08	10 00		0.100	6.400		1.730	2.500	0.078	0.050
75/07/28	10 00		0.025	5.200	0.086	1.800	2.100	0.078	0.050
75/08/11	10 00		0.075	4.800	0.084	1.650	2.200	0.027	0.050
75/08/25	10 00		0.050	6.400	0.160	2.500	3.300	0.003	0.018
75/09/08	11 00		0.025	7.700	0.175	3.200	4.000		0.003

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

091041
34 26 35.0 093 01 05.0
OUACHITA RIVER
05 7.5 HOT SPRINGS S
D/HAMILTON LAKE
HWY 128 BRDG 1.7 MI N OF RED OAK
11EPALES 7111204
4 0000 FEET DEPTH

Reproduced from best available copy.

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10 45		0.092	0.500	0.060	0.005K	0.020
74/07/20	10 30		0.116	0.300	0.050	0.005	0.015
74/08/17	11 05		0.276	1.300	0.575	0.010	0.025
74/09/22	10 00		0.088	0.450	0.060	0.005K	0.012
74/10/19	08 45		0.088	0.300	0.065	0.005K	0.020
74/11/09	09 10		0.072	0.400	0.080	0.010	0.010
74/12/15	09 45		0.088	0.700	0.035	0.005K	0.020
75/01/25	10 30		0.128	0.100	0.040	0.005	0.010K
75/03/09	09 30		0.128	0.300	0.044	0.008K	0.040
75/03/23	10 40		0.136	0.200	0.016	0.008K	0.010K
75/04/06			0.130	0.200	0.015	0.005K	0.020
75/04/13	11 45		0.145	0.300	0.010	0.010K	0.010K
75/04/27	10 00		0.125	0.650	0.025	0.010K	0.020
75/05/03	09 35		0.135	0.350	0.025	0.005K	0.010K

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 75/11/20
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051042
34 34 15 0 093 11 32.0
OUACHITA RIVER
05 7.5 MTN PINE
T/HAMILTON LAKE
SNK JFF LEVEE BLAKELY PTY DAM POWERHOUSE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	14	25	0.112	0.100K	0.020	0.005K	0.005K
74/07/20	14	25	0.148	0.100	0.010	0.005K	0.005
74/08/17	08	10	0.016	0.700	0.020	0.005K	0.020
74/09/22	13	25	0.152	0.300	0.050	0.005K	0.005
74/10/19	09	45	0.120	0.100	0.040	0.005K	0.010K
74/11/09	13	35	0.104	0.200	0.016	0.008K	0.010K
74/12/14	10	00	0.080	0.350	0.020	0.005	0.011
75/01/25	10	30	0.120	0.700	0.016	0.005K	0.010K
75/03/09	11	20	0.128	0.200	0.008	0.008K	0.030
75/03/23	09	00	0.136	0.900	0.028	0.008K	0.020
75/04/13	11	45	0.150	0.900	0.015	0.005K	0.010K
75/04/27	12	30	0.140	0.050K	0.025	0.010	0.010
75/05/02	13	00	0.140	0.200	0.015	0.005K	0.010K
75/05/03	10	00	0.150	0.100	0.015	0.005K	0.010K
75/07/18	09	30			0.010		0.005K

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/23
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051031
36 24 15.0 093 03 55.0
MT CARMEL CREEK
05 7.5 HOT SPRINGS S
T/HAMILTON LAKE
BNK UNIMPROVED RD 0.2 MI S MT CARMEL
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10 10		0.056	0.200	0.025	0.010	0.020
74/07/20	10 10		0.084	0.100	0.020	0.020	0.035
74/08/17	10 15		0.184	0.200	0.015	0.025	0.035
74/09/22	09 45		0.224	0.600	0.030	0.010	0.025
74/10/19	08 30		0.064	0.600	0.060	0.010	0.020
74/11/09	09 00		0.048	0.200	0.008	0.008	0.010
74/12/15	09 30		0.048	0.500	0.010	0.005	0.010
75/01/25	10 15		0.032	0.100K	0.016		0.010K
75/02/15	09 05		0.045	0.100K	0.016	0.008K	0.010K
75/03/09	09 00		0.032	0.100	0.014	0.008K	0.050
75/03/23	08 45		0.048	0.150	0.024	0.008K	0.020
75/04/13	09 20		0.030	0.100	0.015	0.005	0.010
75/04/27	09 30		0.035	0.300	0.085	0.015	0.080
75/05/03	10 00		0.095	0.100	0.020	0.010	0.010

K VALUE KNOWN TO BE LESS THAN INDICATED

[illegible] ARRIVAL DATE - 75/11/23
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0510 01
34 24 09.0 093 05 35.0
FOURCHE A LOUPE CREEK
35 7.5 HOT SPRGS S
T/HAMILTON LAKE
BNK OFF UNIMPROVED RD 0.2 MI SE AP HWY 9
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	09	45	0.040	0.100K	0.020	0.005K	0.010
74/07/20	09	50	0.040	0.100K	0.010	0.010	0.010
74/08/17	10	00	0.052	0.200	0.015	0.005K	0.007
74/09/22	09	30	0.072	0.300	0.030	0.005	0.010
74/10/19	08	15	0.008	0.100K	0.015	0.005K	0.010K
74/11/09	08	45	0.048	0.200	0.024	0.008	0.010
74/12/15	09	15	0.040	1.500	0.032	0.005K	0.010K
75/01/25	10	00	0.024	0.100K	0.016	0.005	0.010K
75/02/15	08	40	0.040	0.400	0.025	0.005	0.010K
75/03/09	08	45	0.024	0.100K	0.008K	0.008K	0.030
75/03/23	08	30	0.032	0.150	0.024	0.008K	0.010
75/04/13	09	00	0.025	0.100	0.010	0.005K	0.010K
75/04/27	09	30	0.020	0.600	0.020	0.010	0.010
75/05/03	07	15	0.055	0.100	0.010	0.005K	0.010K

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
FRA- LAS VEGAS

051031
34 25 35.0 093 10 33.0
LITTLE MAZARN CREEK
05 7.5 HEMPWALLACE
1XHAMILTON LAKE
2NDRY RD BRDG 1.7 MI S US HWY 70 JCT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	13	00	0.112	0.250	0.020	0.010	0.025
74/07/20	13	05	0.008	0.400	0.010	0.005	0.035
74/08/17	09	30	0.072	0.400	0.005	0.005	0.030
74/09/22	13	15	0.048	0.200	0.010	0.010	0.020
74/10/19	08	25	0.024	0.400	0.090	0.005K	0.020
74/11/09	09	00	0.120	1.400	0.216	0.008	0.020
74/12/14	08	30	0.144	0.300	0.025	0.010	0.020
75/01/25	09	00	0.096	0.700	0.024	0.015	0.015
75/02/15	09	00	0.176	0.400	0.080	0.015	0.020
75/03/09	10	10	0.048	0.200	0.008	0.008K	0.040
75/03/23	10	00	0.120	0.250	0.024	0.008	0.030
75/04/13	10	10	0.210	1.650	0.005K	0.005K	0.080
75/04/27	10	30	0.175	0.800	0.120	0.010K	0.060
75/05/03	10	30	0.145	0.300	0.035	0.020	0.030

K VALUE KNOWN TO BE LESS THAN INDICATED

95

NAVL EUTROPHICATION SURVEY
BRA- LAS VEGAS

0510F1
34 29 13.0 093 14 05.0
HAZARN CREEK
QD 7.5 HEMPHILLAGS
T/HAMILTON LAKE
AR HWY 247 BRDG 0.3 MI S SUNSHINE
LLEPALES 2111204
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	13 30		0.020	0.100K	0.015	0.020	0.020
74/07/20	13 25		0.004	0.100K	0.005K	0.005	0.015
74/08/17	13 45		0.040	0.900	0.030	0.005	0.015
74/09/22	13 35		0.032	0.100	0.015	0.010	0.020
74/10/19	08 45		0.008	0.100	0.015	0.010	0.010
74/11/09	09 25		0.032	0.400	0.016	0.008	0.010
74/12/14	09 20		0.048	0.400	0.060	0.005	0.020
75/01/25	09 30		0.016	0.100K	0.008K	0.005	0.010K
75/02/15	09 15		0.024	0.100K	0.016	0.008K	0.010K
75/03/09	10 25		0.012	0.200	0.008	0.008K	0.040
75/03/14	10 30		0.010	0.150	0.015	0.005K	0.010
75/03/23	10 00		0.040	0.350	0.016	0.008	0.020
75/04/27	11 00		0.030	0.350	0.015	0.015	0.030
75/05/03	10 45		0.065	0.200	0.015	0.010	0.020

— K VALUE KNOWN TO BE LESS THAN INDICATED —

84-

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
FRO- LAS VEGAS

351031
34 28 13.0 093 13 07.0
CLEARLY LAKE
US 7.5 MTN PINE
T/HAMILTON LAKE
AT 2NDARY RD FORD 0.5 MI S US 270 JCT
11EPALES 2111204
0000 FEET DEPTH

Reproduced from best available copy.

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 N-NO3+NO2 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	13 45		0.060	0.300	0.030	0.010	0.015
74/07/20	13 50		0.008	0.100	0.005K	0.005	0.020
74/08/17	14 00		0.032	0.200	0.010	0.010	0.015
74/09/22	13 50		0.048	0.200	0.015	0.010	0.015
74/10/19	09 30		0.008	0.100K	0.015	0.010	0.020
74/11/09	09 55		0.072	0.100	0.008K	0.008	0.010
74/12/14	09 20		0.120	0.400	0.025	0.005	0.020
75/01/25	09 55		0.048	0.100K	0.008K	0.005K	0.010K
75/02/15	09 20		0.080	0.300	0.024	0.040	0.057
75/03/09	10 40		0.024	0.200	0.008	0.016	0.030
75/03/14	11 00		0.025	0.100K	0.010	0.005K	0.010K
75/03/23	10 25		0.064	0.150	0.032	0.008K	0.020
75/04/27	11 30		0.040	0.050K	0.015	0.005	0.020
75/05/03	10 10		0.105	0.200	0.015	0.007	0.010K

— K VALUE KNOWN TO BE LESS THAN INDICATED —

EPA- LAS VEGAS

351041
34 33 02.0 093 10 35.0
GLAZYBEAU CREEK
U5 [illegible].5 MTN PINE
T/HAMILTON LAKE
3NW OFF 2NDRY RD 1.7 MI S OF MTN PINE
ILEPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	14	50	0.020	0.100K	0.025	0.010	0.025
74/07/20	14	50	0.016	0.500	0.010	0.015	0.050
74/08/17	15	20	0.008	0.200	0.010	0.010	0.025
74/09/22	13	15	0.080	0.100	0.020	0.010	0.015
74/10/18	10	05	0.008	0.100	0.010	0.010	0.035
74/11/09	11	00	0.056	0.400	0.024	0.008	0.070
74/12/14	09	45	0.104	0.200	0.020	0.020	0.040
75/01/25	11	00	0.048	0.100K	0.016	0.015	0.020
75/02/15	10	05	0.040	0.200	0.016	0.016	0.016
75/03/09	11	00	0.016	0.100	0.008K	0.008	0.050
75/03/23	11	00	0.048	1.300	0.032	0.008	0.030
75/04/13	11	30	0.040	0.600	0.020	0.010	0.020
75/04/27	11	10	0.035	0.500	0.035	0.020	0.030
75/05/03	07	15	0.135	0.150	0.010	0.020	0.020

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051042
34 34 27.0 093 09 31.0
GLAZYPEAU CREEK
05 7.5 MTN PINE
T/HAMILTON LAKE
AR HWY 227 BRDG 0.5 MI E OF MTN PINE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	14	10	0.036	0.100	0.015	0.005K	0.015
74/07/20	14	10	0.032	0.100	0.010	0.005	0.015
74/08/17	14	15	0.028	0.200	0.015	0.005	0.015
74/09/22	13	45	0.080	0.400	0.025	0.020	0.057
74/10/19	09	30	0.024	0.100K	0.020	0.005	0.010
74/11/09	10	10	0.080	0.200	0.016	0.016	0.016
74/12/14	09	55	0.104	0.400	0.015	0.010	0.030
75/01/25	10	20	0.056	0.100K	0.016	0.010	0.010
75/02/15	09	45	0.096	0.200	0.016	0.008	0.010K
75/03/09	11	00	0.032	0.200	0.006K	0.008K	0.050
75/03/23	12	40	0.080	0.150	0.016	0.008	0.020
75/04/13	15	20	0.060	0.400	0.010	0.010	0.010
75/04/27	11	15	0.040	0.050	0.015	0.010	0.010

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
ERB- LAS VEGAS

051001
34 27 55.0 093 06 35.0
BULL BAYOU
35 7.5 HOT SPRINGS N
T/HAMILTON LAKE
2NDRY RD BRDG 1.8 MI E AP HWY 227 JCT
11ERALES 2111204
0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	15 30		0.032	0.400	0.035	0.005K	0.005
74/07/20	15 30		0.028	0.200	0.010	0.005	0.010
74/08/17	15 45		0.028	0.100	0.005	0.005K	0.010
74/09/22	14 15		0.040	0.300	0.020	0.005K	0.015
74/10/18	11 10		0.072	0.100K	0.025	0.005K	0.010
74/11/09	11 30		0.016	0.150	0.008K	0.008K	0.010K
74/12/14	10 30		0.048	0.200	0.015	0.005	0.020
75/01/25	11 45		0.016	0.100K	0.052	0.005K	0.010K
75/02/15	11 12		0.024	0.100K	0.024	0.008K	0.010K
75/03/09	11 15		0.012	0.200	0.024	0.008	0.050
75/03/23	11 20		0.016	0.150	0.016	0.008K	0.010K
75/04/13	12 35		0.020	1.950	0.075	0.005K	0.030
75/04/27	12 00		0.025	0.150	0.015	0.005K	0.010K
75/05/03	12 20		0.035	0.425	0.015	0.010	0.010

— K VALUE KNOWN TO BE LESS THAN INDICATED —

100A

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0510K1
34 27 55.0 093 02 32.0
HOT SPRINGS
05 7.5 HOT SPRINGS S
T/HAMILTON LAKE
UNIMPROVED RD XING 1 MI E AR HWY 7 JCT
11EPALES 2111206
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11 15		6.090	7.500	5.100	0.280	0.800
74/07/20	10 55		7.360	5.200	3.300	0.995	1.720
74/08/17	11 20		6.720	1.500	0.315	0.960	1.450
74/09/22	10 25		4.400	13.000	11.000	0.650	1.100
74/10/19	09 05		5.600	14.000	11.500	0.985	1.250
74/11/09	09 05		1.100L	3.700	0.620L	0.304	0.600
74/12/15	10 00		3.200	3.200	0.040K	0.575	0.840
75/01/25	11 00		1.370	5.000	4.300	0.230	0.600
75/02/15	09 40		1.570	9.490	7.750	0.160	0.420
75/03/09	09 45		1.700	7.000	5.080	1.015	1.400
75/03/23	09 10		1.200	4.400	2.300	0.320	0.790
75/04/13	09 30		2.400	3.100	1.400	0.883	1.200
75/04/27	10 15		3.670	2.500	0.925	0.850	1.200
75/05/03	09 50		1.250	0.550	0.190	0.150	0.200

— K VALUE KNOWN TO BE LESS THAN INDICATED —

1054

NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0510K2
34 28 45.0 093 02 50.0
HOT SPRINGS
05 7.5 HOT SPRINGS
T/HAMILTON LAKE
BNK OFF END SUNNYSIDE ST IN SE HOT SPRIN
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11 30		1.380	14.000	12.000	0.035	0.100
74/07/20	11 10		2.720	7.826	6.050	0.070	0.100
74/08/17	11 30		2.200	1.800	1.050	0.090	0.115
74/09/22	10 40		2.400	21.000		0.090	0.125
74/10/19	09 15		2.080	20.000	19.000	0.135	0.150
74/11/09	09 40		1.230	4.600		0.043	0.070
74/12/15	10 20		1.040	4.200	0.040K	0.005K	0.060
75/01/25	11 15		0.844	1.700	1.250	0.030	0.060
75/02/15	09 50		0.990	7.900	7.100	0.048	0.090
75/03/09	10 06		1.090	1.950	0.965	0.033	0.070
75/03/23	09 30		0.895	1.250	0.805	0.046	0.075
75/04/13	09 45		0.210	1.650	0.005K	0.005K	0.100
75/04/27	10 30		1.250	1.200	0.640	0.090	0.110
75/05/03	10 00		1.150	0.450	0.175	0.050	0.060

— K VALUE KNOWN TO BE LESS THAN INDICATED —

103

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0510HS P00510HS P001150
34 33 40.0 093 10 20.0
MT. PINE
05 7.5 MT. PINE
T/LAKE HAMILTON
GLAZY PEAV CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/02/12	10 00		1.440	1.000K	0.250	1.800	2.000	0.180	
75/03/17	09 45		0.240	6.300	1.300	2.600	3.200	0.159	
75/04/15	11 30		0.500	4.000	0.411	1.830	2.100	0.121	
75/04/28	10 30		0.050	6.900	0.970	1.880	2.200	0.140	
75/05/07	09 45		0.100	6.200	0.310	1.900	2.550	0.104	
75/05/20	10 00		0.100	5.100	0.525	1.730	1.900	0.161	
75/06/39	11 45		0.050	1.900	0.260	1.450	1.700	0.234	
75/07/07	14 15		0.025	2.000	0.063	0.630	0.970	0.013	
75/07/23	11 40		0.050	2.800	0.250	0.730	1.300	0.150	

408

NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0505A1
34 25 37.0 092 53 37.0
QUACHITA RIVER
05 15 MALVERN
O/CATHERINE LAKE
TURBINE EXHAUST AT REMMEL DAM POWERHOUSE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	08 30		0.096	0.200	0.020	0.005K	0.020
74/07/22	10 35		0.146	0.500	0.060	0.005K	0.025
74/08/17	10 30		0.865	1.100	0.570	0.010	0.030
74/09/21	10 20		0.384	0.700	0.500	0.010	0.020
74/10/19	11 30		0.080	1.000	0.080	0.005	0.020
74/11/24	17 20		0.080	0.600	0.056	0.005K	0.040
74/12/22	13 50		0.152	0.700	0.063	0.005	0.010
75/01/19	09 20		0.216	0.200	0.048	0.010	0.010
75/02/22	07 35		0.264	1.300	0.991	0.016	0.030
75/03/07	09 30		0.128	0.400	0.032	0.008K	0.010
75/03/23	10 35		0.112	0.350	0.024	0.008K	0.020
75/04/05	13 05		0.130	0.800	0.360	0.015	0.030
75/04/19	09 30		0.155	0.400	0.115	0.010	0.020
75/05/17	11 30		0.145	0.450	0.035	0.010	0.050

— K VALUE KNOWN TO BE LESS THAN INDICATED —

104

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

050542
34 26 35.0 093 01 05.0
OUACHITA RIVER
05 7.5 S HOT SPRNGS
I/CATHERINE LAKE
HWY 128 BRDG 1.7 MI N OF RED OAK
11EPALES 2111204
0000 FEET DEPTH

Reproduced from best available copy.

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10	35	0.096	0.200	0.030	0.005K	0.015
74/07/22	11	20	0.120	0.700		0.005K	0.025
74/08/17	11	35	0.264	1.100	0.610	0.005	0.030
74/09/21	11	00	0.132	0.300	0.085	0.005K	0.025
74/10/19	10	15	0.080	0.200	0.060	0.005K	0.020
74/11/24	16	15	0.380	1.300	0.096	0.005K	0.020
74/12/22	14	45	0.136	1.300	0.075	0.010	0.020
75/01/19	08	10	0.104	0.100K	0.024	0.005K	0.010K
75/02/22	08	50	0.152	0.300	0.064	0.008K	0.010
75/03/07	10	55	0.128	0.900	0.064	0.008K	0.020
75/03/23	11	45	0.128	0.400	0.024	0.008K	0.010
75/04/05	11	45	0.115	0.250	0.027	0.010	0.040
75/04/19	10	50	0.145	0.200	0.030	0.005K	0.010K
75/05/17	09	45	0.135	0.475	0.050	0.015	0.035

— K VALUE KNOWN TO BE LESS THAN INDICATED —

1054(1)

NATL EUTR PHICATION SURVEY
EPA- LAS VEGAS

050581
34 25 25.0 092 58 00.
COOPER CREEK
05 15 MALVERN
T/CATHERINE LAKE
AR HWY RTDG 171 0.3 MI N AR HWY 290 JCT
11EPALES 2111204
5 0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH DAY	FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11	05		0.020	0.100K	0.015	0.005K	0.005
74/07/22	12	05		0.060	0.200	0.020	0.005K	0.005
74/08/17	12	15		0.032	0.100K	0.015	0.005	0.010
74/09/21	11	15		0.036	0.100	0.040	0.005	0.015
74/10/19	10	00		0.016	0.100K	0.015	0.005K	0.010K
74/11/24	16	00		0.064	0.500	0.040	0.005	0.020
74/12/22	14	50		0.008	0.400	0.035	0.005	0.010K
75/01/19	07	50		0.016	0.100K	0.024	0.005K	0.010K
75/02/22	09	20		0.016	0.200	0.034	0.008	0.010K
75/03/07	11	30		0.008	0.100	0.040	0.008K	0.010K
75/03/23	13	05		0.016	0.100	0.016	0.008K	0.010K
75/04/05	11	30		0.015	0.050K	0.015	0.005K	0.010
75/04/19	11	30		0.010	0.150	0.035	0.005K	0.010K
75/05/17	09	15		0.030	0.300	0.020	0.007	0.030

1661

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

050501
39 28 27.0 092 59 07.0
SULPA CREEK
05 15 MELVERN
T/CATHERINE LAKE
US HWY BRDG 270 5.5 MI SE AR HWY 7 JCT
11EPALES 2111204
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10	10	0.232	0.100K	0.015	0.090	0.125
74/07/22	11	05	0.340	0.800	0.025	0.280	0.340
74/08/17	11	05	0.430	0.300	0.030	0.140	0.210
74/09/21	10	40	0.540	0.300	0.030	0.230	0.280
74/10/19			0.704	0.100	0.030	0.270	0.290
74/11/24	17	05	0.080	0.400	0.024	0.010	0.030
74/12/22	14	30	0.336	0.800	0.075	0.135	0.180
75/01/19	08	30	0.248	0.100K	0.032	0.095	0.100
75/02/22	08	20	0.448	0.600	0.072	0.090	0.179
75/03/07	10	20	0.368	0.300	0.048	0.128	0.150
75/03/21	11	25	0.136	0.350	0.016	0.024	0.060
75/04/05	12	25	0.230	0.100	0.015	0.065	0.090
75/04/19	10	25	0.315	0.350	0.030	0.115	0.130
75/05/17	10	30	0.130	0.300	0.015	0.020	0.040

— K VALUE KNOWN TO BE LESS THAN INDICATED —

1074

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

050501
34 27 50.0 092 54 20.0
TIGRE CREEK
05 15 MALVERN
T/CATHERINE LAKE
US HWY BRDG 270 1 MI W AR HWY 51 JCT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	09 05		0.040	0.150	0.035	0.007	0.035
74/07/22	10 30		0.052	0.500	0.085	0.005	0.025
74/08/17	10 45		0.068	0.500	0.010	0.010	0.040
74/09/21	10 30		0.072	0.200	0.030	0.015	0.060
74/10/19	10 45		0.032	0.400	0.030	0.010	0.010
74/11/24	16 25		0.200	0.700	0.048	0.020	0.060
74/12/22	14 05		0.016	0.700	0.035	0.010	0.010
75/01/19	08 50		0.040	0.800	0.048	0.010	0.010
75/02/22	07 55		0.027	0.400	0.024	0.007	0.010
75/03/07	09 45		0.024	0.200	0.038	0.008	0.010
75/03/23	10 50		0.040	0.200	0.020	0.012	0.020
75/04/05	12 45		0.020	0.050	0.007	0.005	0.020
75/04/19	09 50		0.020	0.250	0.030	0.010	0.010
75/05/17	10 55		0.045	0.500	0.015	0.010	0.030

APPENDIX E

PARAMETRIC RANKINGS OF LAKES
SAMPLED BY NES IN 1974

STATE OF ARKANSAS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
0501	BEAVER LAKE	0.022	0.330	415.667	3.921	14.900	0.006
0502	BLACKFISH LAKE	0.424	1.470	496.125	19.775	12.000	0.090
0503	BLUE MOUNTAIN LAKE	0.050	0.160	484.000	8.983	14.600	0.010
0504	BULL SHOALS LAKE	0.015	0.380	343.969	3.995	15.000	0.004
0505	LAKE CATHERINE	0.029	0.180	451.667	14.042	11.300	0.006
0506	LAKE CHICOT	0.162	0.450	486.000	13.722	14.800	0.089
0507	DEGRAY RESERVOIR	0.019	0.130	419.050	12.300	15.000	0.004
0508	LAKE ERLING	0.054	0.120	454.667	13.369	14.600	0.020
0509	GRAND LAKE	0.101	0.090	479.667	62.867	8.400	0.021
0510	LAKE HAMILTON	0.024	0.130	428.111	10.889	14.400	0.004
0511	MILLWOOD LAKE	0.040	0.120	466.778	14.967	9.800	0.008
0512	NIMROD LAKE	0.039	0.160	409.000	15.833	8.800	0.006
0513	NORFOLK LAKE	0.015	0.320	356.321	3.441	15.000	0.005
0514	LAKE OUACHITA	0.015	0.155	389.144	4.344	15.000	0.004
0515	TABLE ROCK LAKE	0.022	0.350	410.778	9.103	15.000	0.007
0516	GREER'S LAKE	0.012	0.140	370.875	3.762	15.000	0.004

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
0501	BEAVER LAKE	63 (9)	27 (4)	67 (10)	87 (13)	40 (6)	63 (8)
0502	BLACKFISH LAKE	0 (0)	0 (0)	0 (0)	7 (1)	73 (11)	0 (0)
0503	BLUE MOUNTAIN LAKE	20 (3)	47 (7)	13 (2)	67 (10)	57 (8)	27 (4)
0504	BULL SHOALS LAKE	90 (13)	13 (2)	100 (15)	80 (12)	17 (0)	93 (13)
0505	LAKE CATHERINE	47 (7)	40 (6)	47 (7)	27 (4)	80 (12)	53 (8)
0506	LAKE CHICOT	7 (1)	7 (1)	7 (1)	33 (5)	47 (7)	7 (1)
0507	DEGRAY RESERVOIR	73 (11)	77 (11)	60 (9)	47 (7)	17 (0)	93 (13)
0508	LAKE ERLING	27 (4)	90 (13)	40 (6)	40 (6)	57 (8)	20 (3)
0509	GRAND LAKE	13 (2)	100 (15)	20 (3)	0 (0)	100 (15)	13 (2)
0510	LAKE HAMILTON	53 (8)	77 (11)	53 (8)	53 (8)	67 (10)	53 (8)
0511	MILLWOOD LAKE	33 (5)	90 (13)	33 (5)	20 (3)	87 (13)	33 (5)
0512	NIMROD LAKE	40 (6)	53 (8)	27 (4)	13 (2)	93 (14)	47 (7)
0513	NORFOLK LAKE	80 (12)	33 (5)	93 (14)	100 (15)	17 (0)	80 (12)
0514	LAKE OUACHITA	90 (13)	60 (9)	80 (12)	73 (11)	17 (0)	63 (8)
0515	TABLE ROCK LAKE	63 (9)	20 (3)	73 (11)	60 (9)	17 (0)	40 (6)
0516	GREER'S LAKE	100 (15)	67 (10)	87 (13)	93 (14)	27 (0)	93 (13)